

## **Mehta, Sandeep**

---

**From:** Keith Delange <KDelange@geotekeng.com>  
**Sent:** Friday, July 31, 2020 3:37 PM  
**To:** Hylton Jackson; Mehta, Sandeep  
**Cc:** 'Scott.Heemstra@diamondvogel.com'; Eric Smith (ESmith@ramboll.com)  
**Subject:** Vogel's - 2020 Semi-Annual Monitoring Report  
**Attachments:** 2020 Vogel Semi-Annual Report.pdf

Hylton & Sandeep

On behalf of Vogel's we are submitting the 2020 Semi-Annual Monitoring Report.

Let us know if questions or comments. Also, if you would like me to mail a paper copy of the report, let me know and I will get one sent.

Included (Appendix C) in the Semi-Annual Groundwater Monitoring Report is the Post-Injection Monitoring Report, prepared by Ramboll. Based on concerns that well GMW-14 may be compromised, Ramboll has included planned grab groundwater sampling in the former source area (see Section 6 of Appendix C for details). The execution of this sampling is planned to be conducted in the latter part of August to coincide with the next quarterly (Month-9) sampling of the select post injection monitoring wells and select wells in the north portion of the site. Please contact Eric Smith at Ramboll if you have any questions about this additional sampling.

Keith

Keith DeLange  
GeoTek Engineering & Testing Services, Inc.  
909 East 50<sup>th</sup> Street North  
Sioux Falls SD 57104  
P: 605-335-5512  
F: 605-335-0733  
C: 605-940-8469  
[kdelange@geotekeng.com](mailto:kdelange@geotekeng.com)  
[www.geotekeng.com](http://www.geotekeng.com)

**2020  
SEMI-ANNUAL  
MONITORING REPORT**

**VOGEL PAINT & WAX CO. SITE  
MAURICE, IOWA  
July 2020**

**PREPARED BY: GEOTEK ENGINEERING & TESTING SERVICES  
SIOUX FALLS, SOUTH DAKOTA**

**GEOTEK #91-400**

## TABLE OF CONTENTS

<b>Introduction.....</b>	1
<b>2020 Project Results.....</b>	1
Groundwater Monitoring.....	1
<i>Water Levels.....</i>	1
<i>Groundwater Sampling Events .....</i>	1
<b>Discussion of 2020 Results.....</b>	3
<i>BTEX.....</i>	3
<i>Metals.....</i>	3
<i>Free Product .....</i>	3
<b>Recommendations.....</b>	4
<b>Standard of Care.....</b>	4
<b>Remarks.....</b>	4

## TABLES

1. 2020 Groundwater Elevations
2. 2015 -2020 Groundwater BTEX Data
3. Groundwater Metals Data
4. Summary Field Geochemical Data (MNA)
5. Free Product Well – MW4R

## FIGURES

1. Site Map
2. Groundwater Contour Map (April 18, 2020)
3. Benzene Plume Map
4. Toluene Plume Map
5. Ethylbenzene Plume Map
6. Xylenes Plume Map

## APPENDICES

- A. Graphs – Groundwater Elevations
- B. Laboratory Analytical Reports
- C. Post-Injection Monitoring Report (Ramboll)

**2020 SEMI-ANNUAL GROUNDWATER MONITORING REPORT**  
**VOGEL'S PAINT WASTE SITE**

**Introduction**

This report provides the results of activities completed at the Vogel Paint & Wax Company site near Maurice, Iowa from January through June 2020. Activities included the completion of groundwater sampling events for benzene, toluene, ethylbenzene, and xylenes (BTEX) and metals, and field measurement of geochemical parameters. Project events and results are discussed briefly below.

**2020 Project Results**

**Groundwater Monitoring**

*Water Levels*

In addition to the groundwater monitoring/sampling events discussed below, water levels were measured at selected monitoring wells on an approximate monthly basis. Table 1 provides groundwater elevation data for selected events from January through June 2020. Figure 2 is a groundwater contour map based on April 18, 2020 water level measurements from the majority of wells at the site.

Recent reports have discussed the higher water table in 2018 and 2019, resulting from higher than normal precipitation. Through June 2020, precipitation appears to be normal and the water table has been noted to have dropped as compared to the highs in 2018 and 2019. Several graphs illustrating groundwater elevations at selected wells over time are provided in Appendix A.

Graphs for GMW-21 and GMW-30 show groundwater elevations from 2004 through June 2020. A graph for TC-6D shows groundwater elevations from 1992 to the present. The graphs for these three wells illustrate the 2018 – 2019 water levels were the highest noted to date for the site.

Graphs for additional wells (GMW's 4, 7R, 9R, 13, 14, 36 and TC-6D) are also included in Appendix A, showing groundwater elevations for 2018 through June 2020. Review of these graphs indicate fairly stable water levels in 2020, however, the groundwater elevations are several feet higher than at the beginning of 2018.

*Groundwater Sampling Events*

**February 10 & 11, 2020**

February 10 – Groundwater samples were collected from the seven wells chosen as baseline wells for the Pilot Study: GMW's 7R, 10R, 11, 13, 14, 15 and 21. Collected samples were submitted for laboratory analysis to Microbial Insights. Samples were also submitted to Test America laboratories for BTEX analysis. With the exception of GMW-14, samples were collected from the wells by low-flow sampling using a Grundfos pump and portable generator. GMW-14 was sampled by conventional bailing. Using a YSI meter, field parameters were measured at all sampled wells.

February 11, 2020 – Groundwater samples were collected from the following site monitoring wells: GMW-1, GMW-4, RMW's 1 thru 4, TC-7, TC-10 and MW3. TC-10, GMW-1 and MW-3 were sampled by conventional bailing. For the remainder of the wells, samples were collected using the Grundfos pump. Collected groundwater samples were submitted for BTEX analysis. Field parameters were measured with the YSI meter at all sampled wells.

### **March 18, 2020**

An additional sampling event was completed for GMW-14. Field parameters were initially measured, then approximately 4 well volumes were removed from the well by bailing. The well was allowed to stabilize for a period of time. Groundwater samples were then collected from GMW-14 by low-flow sampling using a GeoTech bladder pump. Collected groundwater samples were submitted for BTEX analysis. Field parameters were measured using the YSI meter prior to and during the sampling process.

### **April 22, 2020**

On April 22, 2020, groundwater samples were collected from 12 monitoring wells and submitted for laboratory analysis for BTEX. Sampled wells included the monitoring wells on the property south of Vogel's (GMW's 25, 30, 35 thru 42, and 44) and one well on the Vogel property line (GMW-19). These wells were sampled as part of the semi-annual monitoring event for the site. The sampling of these wells was completed ahead of other wells in the semi-annual monitoring schedule in order for selected wells to be capped and buried to allow the landowner to complete spring planting activities. On April 23, 2020, the following wells were capped and buried: GMW's 25, 30, 38, 40, 41, 42 and 44.

### **May 11 & 12, 2020**

May 11, 2020 – sampling of the seven Pilot Study baseline wells (GMW's 7R, 10R, 11, 13, 14, 15 and 21) was completed. Collected samples were submitted for analysis to Microbial Insights. Additional samples were also provided to Test America for BTEX analysis.

The following wells were also sampled on May 11, 2020: GMW-9R, GMW-20, GMW-33 and TC-6D. Collected samples were submitted for BTEX analysis. For the May 11 sampling event, groundwater samples were also collected and submitted for analysis of dissolved metals from the following wells: GMW's 7R, 9R, 13, 14 and 15 and from TC-6D.

May 12, 2020 – Groundwater samples were collected from 9 wells (GMW-1, GMW-4, RMW's 1 thru 4, TC-7, TC-10 and MW3) and submitted for BTEX analysis. Additional groundwater samples were also collected and submitted for analysis of dissolved metals from the following wells: RMW's 1 thru 4, GMW-4 and TC-7.

The laboratory reports associated with the sampling events noted above are provided in Appendix B, with the exception of laboratory reports included in Ramboll's Post-Injection Monitoring Report (Appendix C). Table 2 summarizes BTEX data resulting from monitoring events in 2015 through 2020. Accumulated metals analytical results for the site are provided in Table 3.

As noted above, field parameters were measured during the groundwater monitoring events completed in 2020. A YSI meter was used to measure the following parameters: temperature, pH, oxygen reducing potential/redox (ORP), conductivity, and dissolved oxygen (DO). The data from the 2020 monitoring events, along with data from previous monitoring events, is summarized on Table 4.

Annual sampling of groundwater at nine site monitoring wells (GMW's 7R, 9R, 13, 21, 25, 30 and 35 and MW's 1 and 5) has been completed since 2012, with collected samples being submitted for laboratory analysis of BTEX, nitrate ( $\text{NO}_3^-$ ), sulfate ( $\text{SO}_4^{2-}$ ), dissolved iron ( $\text{Fe}^{+2}$ ), total iron ( $\text{Fe}^{+3}$ ), dissolved manganese ( $\text{Mn}^{+2}$ ), total manganese, alkalinity and methane. The annual sampling event for these parameters will be completed during the Fall 2020 groundwater monitoring event, anticipated to be completed in November 2020.

## **Discussion of 2020 Results**

### *BTEX*

Benzene, toluene, ethylbenzene and xylene plumes are provided as Figures 3 through 6. The plume extent for each constituent was estimated using the most recent data available for each monitoring well. April/May 2020 BTEX data is available for 31 site monitoring wells. For the 15 wells not yet sampled in 2020, the BTEX data from the December 2019 monitoring event was used for plume estimation. The dates of sampling for each well are indicated on the plume maps.

The contaminant plume maps provided with this semi-annual report are similar in extent and concentrations to those provided in the 2019 Annual Report with some exceptions. In particular, based on the recent 2020 results, maximum contaminant levels (MCLs) are not exceeded at any off-site wells or at any of the south Vogel property line wells. Further discussion of BTEX results for selected post-injection wells is presented in Ramboll's Post-Injection Monitoring Report included in Appendix C.

### *Metals*

As indicated in the discussions of groundwater sampling events above, groundwater samples were collected from twelve wells in May 2020 and submitted for laboratory analysis for metals (arsenic, cadmium, chromium, lead and mercury). The wells included for dissolved metals analysis were: GMW's 4, 7R, 9R, and 13 thru 15, RMW's 1 thru 4, and TC's 6D and 7. Accumulated metals data is provided on Table 3.

Review of the May 2020 sampling results indicates arsenic was detected in ten of the sampled wells, but at concentrations less than the arsenic MCL. The only other detections of metals for the sampled wells were cadmium (GMW-4), chromium (GMW-14) and mercury (GMW-14). The concentrations for these detected metals were well below the applicable MCLs.

### *Free Product*

Measurable free product has not been present at the site to date in 2020. Table 5 summarizes water level measurement events at MW4R from June 2019 thru June 2020.

## **Recommendations**

Additional 2020 groundwater monitoring events are currently scheduled for August and November. As noted in the 2019 Annual Report, the August 2020 event will be a quarterly sampling of the seven Pilot Study baseline wells. The August sampling event will also include sampling of RMW's 1 thru 4, GMW's 1 and 4, TC's 7 and 10, and MW3.

The groundwater monitoring scheduled for November 2020 is considered the annual monitoring event for the site. Completion dates for the annual monitoring event may need to be adjusted dependent on weather and crop harvest. Following crop harvest, the off-site wells previously indicated as being buried and capped will be located, dug out and re-elevated with aboveground casing.

The current schedule calls for submittal of the 2020 Annual Report by February 10, 2021.

## **Standard of Care**

Recommendations contained in this report represent our professional opinions. These opinions are based on information currently available and arrived in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this no warranty is implied or intended.

## **Remarks**

Please contact our office if there are questions regarding the project or this report.

Respectfully Submitted  
GeoTek Engineering & Testing Services, Inc.

*Keith DeLange*

Keith DeLange  
Sr. Project Manager

**TABLE 1 – 2020 GROUNDWATER ELEVATION DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Well#	Top-of-Riser Elevation	Date of Water Level Measurements								
		1/3/2020	1/16/2020	2/6/2020	2/10 & 2/11/2020	3/18/2020	4/17/2020	4/22/2020	5/11 & 5/12/2020	6/17/2020
GMW-1	1286.86	1281.63	1281.03	1281.06	1280.83	1280.74	1281.26		1280.77	1280.75
GMW-3	1294.58	1282.77	1282.04	1282.01		1281.45	1282.15			1281.55
GMW-4	1288.12	1282.93	1282.33	1282.34	1282.07	1281.93	1282.41		1282.01	1281.97
GMW-6	1314.91	1281.41		1282.16		1281.14	1281.55			1281.32
GMW-7R	1317.58	1282.08		1281.75	1281.24	1280.81	1281.16		1280.87	1281.01
GMW-8	1312.64	1283.27	1282.54	1282.74		1281.90	1282.53			1282.07
GMW-9R	1302.01	1286.19	1284.96	1283.29		1282.54	1283.24		1282.42	1282.02
GMW-10R	1303.37	1284.34	1283.10	1283.51	1283.25	1282.80	1283.26		1283.22	1282.51
GMW-11	1304.57	1283.07	1282.27	1282.67	1282.16	1281.76	1282.24		1281.77	1281.89
GMW-13	1297.27	1283.07	1282.75	1282.79	1282.45	1282.17	1282.84		1282.32	1282.29
GMW-14	1296.27	1283.62	1282.89	1282.85	1282.49	1282.12	1282.83		1282.28	1282.23
GMW-15	1315.41	1282.44	1281.75	1282.08	1281.59	1281.15	1281.58		1281.25	1281.32
GMW-16	1314.52	1282.57	1281.86	1282.22		1281.32	1281.74			1281.47
GMW-17	1318.65	1282.45		1282.10		1281.09	1281.89			1281.52
GMW-18R	1321.24	1282.56		1282.23		1281.24	1281.67			1281.43
GMW-19	1317.29	1281.81		1281.55		1280.54	1280.89	1281.12		1280.74
GMW-20	1319.63	1282.21		1281.85		1280.91	1281.29		1281.02	1281.18
GMW-21	1322.18	1281.75		1281.40	1280.94	1280.49	1280.79		1280.58	1280.71
GMW-22	1319.85	1281.63		1281.29		1280.37	1280.67			1280.58
GMW-25	1313.38	1280.15		1279.92		1278.93	1279.10	1279.34		
GMW-30	1306.37	1279.72		1279.44		1278.50	1278.65	1278.87		
GMW-33	1321.62	1281.98		1282.04		1281.04	1281.28		1281.03	1281.16
GMW-35	1300.35	1274.65		1274.38		1273.67	1273.76	1273.94		1273.88
GMW-36	1306.82	1278.29		1277.96		1277.05	1277.21	1277.40		1277.37
GMW-37	1314.94	1278.80		1278.55		1277.62	1277.75	1277.97		1277.92
GMW-38	1311.38	1278.95		1278.61		1277.72	1277.88	1278.10		
GMW-39	1300.08	1280.82		1278.82		1277.81	1277.97	1278.45		1278.28
GMW-40	1305.67	1280.30		1279.93		1278.95	1279.05	1279.39		
GMW-41	1320.68	1279.35		1279.18		1278.21	1278.34	1278.57		
GMW-42	1299.65	1277.93		1277.55		1276.67	1276.85	1277.05		
GMW-44	1311.27	1280.94		1280.55		1279.58	1279.82	1280.04		
MW1	1294.24	1284.45	1283.24	1283.93		1283.36	1283.89			1283.39
MW3	1284.80	1279.05		1278.63	1278.25	1278.43	1278.78		1278.55	1278.63
MW5	1317.39	1281.73		1281.67		1280.66	1280.77			1280.84
TC-6D	1309.35	1282.81	1282.12	1282.44		1281.53	1282.01		1281.58	1281.70
TC-7	1286.62	1281.90	1281.28	1281.28	1281.05	1280.89	1281.39		1280.99	1280.97
TC-10	1286.45	1281.51	1280.96	1280.95	1280.71	1280.61	1281.10		1280.71	1280.68
TC-17D	1308.90	1283.11	1282.40	1282.66		1281.81	1282.32			1281.95
TC-23	1323.62	1282.32		1282.16		1281.07	1281.46			1281.27
RMW-1	1295.65	1283.35	1282.70	1282.74	1282.41	1282.23	1282.78		1282.34	1282.28
RMW-2	1295.62	1283.34	1282.63	1282.67	1282.37	1282.08	1282.72		1282.24	1282.18
RMW-3	1293.61	1283.28	1282.54	1282.54	1282.21	1281.91	1282.61		1282.09	1282.03
RMW-4	1289.83	1283.10	1282.42	1282.44	1282.14	1281.92	1282.51		1282.04	1282.00

Blank cells indicate measurement not taken

Elevations in Feet Above Sea Level (Ft. ASL)

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
12/19/2018	GMW-1 (bail)	<2	17.4	195	252	1282.10
12/11/2019	GMW-1 (bail)	2.85	<2	872	725	1281.38
02/11/2020	GMW-1 (bail)	3.6	2	850	460	1280.83
05/12/2020	GMW-1 (bail)	1.97	<1	170	100	1280.77
01/18/2018	GMW-2 (bail)	<2	<2	<2	<6	1279.62
12/13/2018	GMW-2 (bail)	<2	<2	<2	<6	1286.69
12/11/2019	GMW-2 (bail)	<2	<2	<2	<6	1283.10
12/02/2015	GMW-3 (PDB) 1277.52	<0.5	<1	<1	<3	1279.08
12/19/2016	GMW-3 (bail)	<2	<2	<2	<6	1281.68
12/13/2017	GMW-3 (bail)	<2	<2	<2	<6	1281.01
12/06/2018	GMW-3 (bail)	<2	<2	<2	<6	1284.46
12/11/2019	GMW-3 (bail)	<2	<2	<2	<6	1282.41
05/13/2015	GMW-4 (PDB) 1277.37	<0.5	<4	<4	<3	1277.37
12/02/2015	GMW-4 (PDB) 1273.39	<0.5	<1	<1	<3	1278.01
12/19/2016	GMW-4 (bail)	<2	<2	<2	<6	1279.63
07/25/2017	GMW-4 (bail)	<2	<2	<2	<6	1279.27
12/13/2017	GMW-4 (bail)	<2	<2	<2	<6	1279.11
12/06/2018	GMW-4 (bail)	<2	191	426	4510	1283.57
12/11/2019	GMW-4 (LF)	<2	<2	<2	<6	1282.61
02/11/2020	GMW-4 (LF)	0.58	1.8	4.3	21	1282.07
05/12/2020	GMW-4 (LF)	<0.50	2.5	6.4	28	1282.01
12/02/2015	GMW-6 (PDB) 1274.80	<0.5	<1	<1	<3	1275.51
12/12/2017	GMW-6 (bail)	<2	<2	<2	<6	1278.53
12/04/2018	GMW-6 (LF)	<2	<2	<2	<6	1286.04
12/10/2019	GMW-6 (LF)	<2	<2	<2	<6	1282.17
03/26/2015	GMW7R (PDB)1264.80	<0.5	<1	4.24	16.9	1274.87
05/13/2015	GMW7R (PDB)1274.95	<b>6.49</b>	<1	<b>4,550</b>	<b>13,700</b>	1274.95
10/12/2015	GMW7R (PDB)1274.46	<b>5.11</b>	<10	<b>4,180</b>	<b>12,200</b>	1274.94
10/12/2015	GMW-7R (bail)	<b>5.5</b>	<10	<b>3,150</b>	9,330	1274.94
12/03/2015	GMW-7R-P1 1275.66	<b>2.04</b>	<4	<b>933</b>	<b>3,520</b>	1274.98
12/03/2015	GMW-7R-P2 1274.16	<5	<10	<b>2,960</b>	8,230	1274.98
12/03/2015	GMW-7R-P3 1272.66	<5	<10	<b>875</b>	1,900	1274.98
12/03/2015	GMW-7R-P4 1271.16	<0.5	<1	48.7	38.1	1274.98
12/03/2015	GMW-7R-P5 1269.66	<0.5	<1	1.07	<3	1274.98
12/03/2015	GMW-7R-P6 1268.16	<0.5	<1	<1	<3	1274.98
12/03/2015	GMW-7R (bail)	<5	<10	<b>3,030</b>	9,010	1274.98
05/24/2016	GMW7R (PDB)1274.96	<0.5	<1	<1	<3	1278.13
06/08/2016	GMW-7R (bail)	3.32	<1.5	<b>2,630</b>	9,390	1278.81
07/14/2016	GMW-7R (bail)	3.06	<1	<b>2,410</b>	8,280	1279.34
12/19/2016	GMW-7R (bail)	4.69	<2	<b>3,340</b>	<b>11,400</b>	1278.65
06/08/2017	GMW7R (PDB)1274.46	<2	<2	10.9	6.21	1279.27
06/08/2017	GMW-7R (bail)	2.37	<2	<b>1,480</b>	4,120	1279.27
07/25/2017	GMW-7R (bail)	4.45	<0.187	<b>998</b>	2,700	1279.43
12/12/2017	GMW-7R (bail)	<2	<2	<b>1,570</b>	4,130	1278.09
12/19/2017	GMW-7R (LF)	<20	<2	<b>2,060</b>	5,330	1277.90
04/05/2018	GMW-7R (bail)	3.52	<2	<b>2,500</b>	7,650	1277.63

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
12/05/2018	GMW-7R (LF)	<2	<2	1,230	3,980	1285.85
06/20/2019	GMW-7R (bail)	3.51	<2	2,430	8,020	1286.28
10/03/2019	GMW-7R (bail)	1.30	<1	820	4,300	1282.62
12/12/2019	GMW-7R (LF)	<0.5	<1	<1	<3	1282.17
02/10/2020	GMW-7R (LF)	<0.5	<1	<1	<3	1281.24
05/11/2020	GMW-7R (LF)	<0.5	<1	2.8	4.5	1280.87
12/02/2015	GMW-8 (PDB) 1275.95	<0.5	<1	<1	<3	1276.69
12/19/2016	GMW-8 (bail)	<2	<2	<2	<6	1280.25
12/13/2017	GMW-8 (bail)	<2	<2	<2	<6	1279.48
12/04/2018	GMW-8 (LF)	<2	<2	<2	<6	1286.12
12/10/2019	GMW-8 (LF)	<2	<2	<2	<6	1282.94
03/26/2015	GMW9R (PDB)1271.06	<5	81.6	1,320	2,870	1276.30
05/13/2015	GMW9R (PDB)1276.40	<0.5	13.4	115	154	1276.40
10/12/2015	GMW9R (PDB)1275.79	<5	1,080	1,920	5,160	1276.31
10/12/2015	GMW-9R (bail)	<5	1,830	4,910	17,200	1276.31
12/03/2015	GMW-9R-P1 1275.79	<0.5	<1	16.7	118	1276.62
12/03/2015	GMW-9R-P2 1274.29	<0.5	14.7	149	752	1276.62
12/03/2015	GMW-9R-P3 1272.79	<0.5	11.3	188	965	1276.62
12/03/2015	GMW-9R (bail)	<5	1,400	3,920	14,900	1276.62
03/07/2016	GMW-9R-P1 1271.19	<0.5	<1	<1	<3	1278.75
03/07/2016	GMW-9R-P2 1269.69	<0.5	<1	<1	<3	1278.75
05/24/2016	GMW9R (PDB)1277.54	<0.5	<1	<1	<3	1280.69
07/14/2016	GMW-9R (bail)	5.32	1,310	9,310	29,600	1280.46
12/19/2016	GMW-9R (bail)	5.28	1,530	8,180	24,600	1280.09
06/08/2017	GMW-9R (bail)	4.23	1,300	5,830	21,000	1280.83
07/25/2017	GMW-9R (bail)	8.47	2,720	12,900	54,800	1280.37
12/13/2017	GMW-9R (bail)	8.03	1,710	14,200	49,000	1279.34
04/05/2018	GMW-9R (bail)	6.21	773	6,600	23,700	1279.40
12/06/2018	GMW-9R (LF)	<2	140	2,060	6,120	1286.65
05/02/2019	GMW-9R (bail)	3.84	106	5,730	17,300	1285.46
12/11/2019	GMW-9R (LF)	<2	31.9	2,020	6,040	1285.69
05/11/2020	GMW-9R (LF)	2.34	539	9,160	26,500	1282.42
03/26/2015	GMW10R(PDB)1271.41	<0.5	<1	<1	6.99	1276.69
05/13/2015	GMW10R(PDB)1276.81	<0.5	<1	<1	<3	1276.81
10/12/2015	GMW10R(PDB)1276.20	<0.5	<1	1.49	15	1276.68
12/03/2015	GMW-10R-P1 1276.20	<0.5	<1	1.32	13.3	1277.10
12/03/2015	GMW-10R-P2 1274.70	<0.5	<1	168	844	1277.10
12/03/2015	GMW-10R-P3 1273.20	<0.5	<1	1.33	5.17	1277.10
12/03/2015	GMW-10R (bail)	10.3	44	5,920	20,800	1277.10
03/07/2016	GMW-10R-P1 1271.30	<0.5	<1	<1	<3	1279.25
03/07/2016	GMW-10R-P2 1269.80	<0.5	<1	<1	<3	1279.25
05/24/2016	GMW10R(PDB)1277.90	<0.5	<1	<1	<3	1281.34
12/19/2016	GMW-10R (bail)	<2	<2	2,040	7,180	1280.53
06/08/2017	GMW-10R (bail)	4.10	108	3,120	10,600	1281.29
12/13/2017	GMW-10R (bail)	8.89	319	6,910	25,900	1279.70
04/05/2018	GMW-10R (bail)	5.05	279	3,100	12,500	1279.72
12/06/2018	GMW-10R (bail)	3.11	280	2,870	11,400	1286.34

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
05/02/2019	GMW-10R (bail)	<2	4.27	31	117	1285.38
10/03/2019	GMW-10R (bail)	0.59	2.0	790	2,000	1285.06
12/12/2019	GMW-10R (LF)	1.20	16	1,400	5,500	1284.82
02/10/2020	GMW-10R (LF)	6.8	440	6,100	28,000	1283.25
05/11/2020	GMW-10R (LF)	10	58	6,400	26,000	1283.22
03/07/2016	GMW11 (PDB) 1276.60	<0.5	<1	<1	<3	1278.16
03/02/2017	GMW-11 (bail)	<2	6.12	1,440	5,640	1279.21
12/06/2018	GMW-11 (LF)	<3.95	3.60	773	2,960	1285.67
10/03/2019	GMW-11 (bail)	<0.5	<1	<1	<3	1283.64
12/12/2019	GMW-11 (LF)	<0.5	13	45	150	1283.15
02/10/2020	GMW-11 (LF)	<0.5	<1	2	4.1	1282.16
05/11/2020	GMW-11 (LF)	<0.5	<1	<1	<3	1281.77
05/13/2015	GMW13 (PDB) 1277.46	3.85	8,970	17,900	97,800	1277.79
10/12/2015	GMW13 (PDB) 1277.16	<5	8,650	28,400	139,000	1277.59
10/12/2015	GMW-13 (bail)	<5	23,900	52,500	105,000	1277.59
12/03/2015	GMW-13-P1 1277.16	<5	9,910	19,800	104,000	1278.21
12/03/2015	GMW-13-P2 1275.66	<5	9,510	18,700	96,000	1278.21
12/03/2015	GMW-13 (bail)	<5	9,380	18,200	99,300	1278.21
03/07/2016	GMW-13-P1 1274.31	<110	7,750	16,000	84,600	1280.33
03/07/2016	GMW-13-P2 1272.81	<110	8,430	14,200	70,900	1280.33
07/14/2016	GMW-13 (bail)	5	9,330	18,100	92,100	1281.28
12/19/2016	GMW-13 (bail)	21.8	7,070	16,100	94,500	1281.01
07/25/2017	GMW-13 (bail)	14.6	8,540	18,000	86,300	1280.84
12/13/2017	GMW-13 (bail)	6.55	8,970	20,200	93,600	1280.29
12/06/2018	GMW-13 (bail)	<20	3,120	18,900	66,300	1285.09
06/20/2019	GMW-13 (bail)	12.2	22,300	21,900	85,800	1285.65
10/03/2019	GMW-13 (bail)	14	23,000	19,000	90,000	1284.64
12/12/2019	GMW-13 (LF)	7	12,000	18,000	87,000	1283.32
02/10/2020	GMW-13 (LF)	6.7	9,900	16,000	77,000	1282.45
05/11/2020	GMW-13 (LF)	6.2	7,900	17,000	87,000	1282.32
12/02/2015	GMW14 (PDB) 1276.85	61.9	41,900	32,800	166,000	1277.76
12/19/2016	GMW-14 (bail)	79.8	23,900	23,600	121,000	1280.83
01/18/2018	GMW-14 (LF)	60.5	16,600	13,100	61,800	1279.83
12/06/2018	GMW-14 (bail)	41.5	15,200	12,300	67,000	1286.10
05/02/2019	GMW-14 (bail)	33	11,800	10,800	74,700	1284.99
10/03/2019	GMW-14 (bail)	51	15,000	17,000	87,000	1284.48
12/12/2019	GMW-14 (bail)	29	13,000	13,000	91,000	1283.51
02/10/2020	GMW-14 (bail)	36	14,000	12,000	93,000	1282.49
03/18/2020	GMW-14 (LF)	59	14,000	16,000	95,000	1282.12
05/11/2020	GMW-14 (LF)	33	8,900	11,000	79,000	1282.28
03/26/2015	GMW15 (PDB) 1261.30	5.39	<10	368	2710	1275.19
05/13/2015	GMW15 (PDB) 1275.29	8.06	1.35	2,030	9,990	1275.29
10/12/2015	GMW15 (PDB) 1274.79	2.13	<4	370	495	1275.24
12/03/2015	GMW-15-P1 1272.30	<5	<10	537	1,040	1275.36
12/03/2015	GMW-15-P2 1270.80	<5	<10	395	777	1275.36
12/03/2015	GMW-15-P3 1269.30	<5	<10	363	732	1275.36
12/03/2015	GMW-15 (bail)	<5	<10	540	4,310	1275.36

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
03/07/2016	GMW-15-P1 1273.30	<0.5	<1	38.7	290	1276.96
03/14/2016	GMW-15-P3 1270.30	<0.5	<1	2.21	124	1277.00
03/14/2016	GMW-15-P4 1268.80	<0.5	<1	2.13	42.40	1277.00
03/14/2016	GMW-15-P5 1267.30	<0.5	<1	1.55	30.1	1277.00
03/14/2016	GMW-15-P6 1265.80	<0.5	<1	<1	14.5	1277.00
05/24/2016	GMW-15 (PDB) 127.80	3.56	16.2	615	2,990	1278.63
12/19/2016	GMW-15 (bail)	2.23	<2	992	4,990	1279.00
06/08/2017	GMW-15 (bail)	2.57	2.37	1,080	4,040	1279.64
07/25/2017	GMW-15 (bail)	4.86	<0.187	1,280	4,320	1279.73
12/12/2017	GMW-15 (bail)	<2	<2	1,330	5,460	1278.48
04/05/2018	GMW-15 (bail)	<2	<2	1,120	4,090	1278.02
12/05/2018	GMW-15 (LF)	<2	<2	85	556	1285.88
05/02/2019	GMW-15 (LF)	2.32	<2	87	1,020	1283.41
10/03/2019	GMW-15 (bail)	<0.5	<1	120	830	1282.92
12/12/2019	GMW-15 (LF)	<0.5	8.1	97	540	1282.55
02/10/2020	GMW-15 (LF)	<0.5	<1	8.6	67	1281.59
05/11/2020	GMW-15 (LF)	<0.5	<1	2.7	57	1281.25
12/02/2015	GMW16 (PDB) 1271.44	<0.5	<1	112	32	1275.56
03/07/2016	GMW-16-P1 1271.44	<0.5	<1	129	316	1277.19
03/07/2016	GMW-16-P2 1269.94	<0.5	<1	47	77.4	1277.19
03/07/2016	GMW-16-P3 1268.44	<0.5	<1	60.2	166	1277.19
12/19/2016	GMW-16 (bail)	2.67	35.6	2,980	10,500	1279.16
12/12/2017	GMW-16 (bail)	<2	31.5	937	2,950	1278.66
12/05/2018	GMW-16 (LF)	<2	8.46	178	450	1285.96
12/10/2019	GMW-16 (LF)	<2	10.1	146	489	1282.31
12/02/2015	GMW17 (PDB) 1274.50	1.05	<1	489	722	1275.25
12/19/2016	GMW-17 (bail)	<2	<2	120	420	1278.93
12/12/2017	GMW-17 (bail)	<2	<2	10.7	23.9	1278.44
12/05/2018	GMW-17 (LF)	<2	<2	13.9	38.9	1285.89
12/10/2019	GMW-17 (LF)	<2	<2	<2	<6	1284.23
12/02/2015	GMW18R(PDB)1274.51	<0.5	<1	<1	<3	1275.24
12/19/2016	GMW-18R (bail)	<2	<2	4.42	6.50	1278.95
12/12/2017	GMW-18R (bail)	<2	<2	5.76	14.7	1278.45
12/05/2018	GMW-18R (LF)	<2	<2	20.8	55.2	1285.97
12/10/2019	GMW-18R (LF)	<2	<2	2.5	<6	1282.28
03/26/2015	GMW19 (PDB) 1265.76	<0.5	<1	<1	4.76	1275.59
05/13/2015	GMW19 (PDB) 1274.68	<0.5	<1	<1	<3	1274.68
12/03/2015	GMW19 (PDB) 1274.21	<0.5	<1	<1	<3	1274.73
12/03/2015	GMW-19 (bail)	1.06	<1	<1	75.2	1274.73
05/24/2016	GMW19 (PDB) 1276.96	<0.5	<1	13.5	46.7	1277.86
06/08/2016	GMW-19 (bail)	3.39	<1	1,520	6,150	1278.56
12/19/2016	GMW-19 (bail)	<2	<2	<2	<6	1278.41
06/08/2017	GMW19 (PDB) 1277.00	<2	<2	<2	<6	1279.02
06/08/2017	GMW-19 (bail)	<2	<2	<2	<6	1279.02
12/12/2017	GMW-19 (bail)	<2	<2	<2	<6	1277.84
12/19/2017	GMW-19 (LF)	<2	<2	25.1	79.4	1277.67
04/05/2018	GMW-19 (bail)	<2	<2	<2	<6	1277.37

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
12/05/2018	GMW-19 (LF)	<2	<2	3.19	9.01	1285.64
05/02/2019	GMW-19 (LF)	<2	<2	3.30	6.78	1282.78
12/10/2019	GMW-19 (LF)	<2	<2	<2	<6	1281.62
04/22/2020	GMW-19 (LF)	<2	<2	<2	<6	1281.12
03/26/2015	GMW20 (PDB) 1268.46	<0.5	<1	<1	<3	1274.82
05/13/2015	GMW20 (PDB) 1274.88	<0.5	<1	<1	<3	1274.88
12/03/2015	GMW20 (PDB) 1274.41	<0.5	<1	<1	<3	1274.94
12/03/2015	GMW-20 (bail)	<5	<10	310	1,040	1274.94
05/24/2016	GMW20 (PDB) 1277.16	<0.5	<1	<1	<3	1278.25
06/08/2016	GMW-20 (bail)	1.67	<1	<b>811</b>	2,930	1278.76
12/19/2016	GMW-20 (bail)	<2	<2	537	2,160	1278.61
06/08/2017	GMW-20 (bail)	<2	<2	573	1,760	1279.24
12/12/2017	GMW-20 (bail)	<2	<2	<b>1,430</b>	4,180	1278.10
04/05/2018	GMW-20 (bail)	<2	<2	<b>2,120</b>	6,990	1277.63
12/05/2018	GMW-20 (LF)	<2	<2	479	1,470	1285.88
05/02/2019	GMW-20 (LF)	<2	<2	<b>1,330</b>	4,180	1283.12
12/10/2019	GMW-20 (LF)	<2	<2	<2	<6	1281.96
05/11/2020	GMW-20 (LF)	<2	<2	<2	<6	1281.02
03/26/2015	GMW21 (PDB) 1267.99	4.50	<1	<b>1,050</b>	1,640	1274.56
05/13/2015	GMW21 (PDB) 1274.65	<b>11.7</b>	<1	<b>4,150</b>	8,780	1274.65
10/12/2015	GMW21 (PDB) 1273.86	<b>11.9</b>	<1	<b>7,800</b>	<b>16,100</b>	1274.67
10/12/2015	GMW-21 (bail)	<5	<10	<b>757</b>	4,520	1274.67
12/03/2015	GMW-21-P1 1273.86	<b>10.7</b>	<10	<b>5,470</b>	<b>12,700</b>	1274.67
12/03/2015	GMW-21-P2 1272.36	<b>7.28</b>	<10	<b>2,680</b>	4,530	1274.67
12/03/2015	GMW-21-P3 1270.86	<b>6.82</b>	<10	<b>2,430</b>	4,310	1274.67
12/03/2015	GMW-21-P4 1269.36	<b>6.31</b>	<10	<b>1,790</b>	2,800	1274.67
12/03/2015	GMW-21-P5 1267.86	3.44	<1	<b>832</b>	867	1274.67
12/03/2015	GMW-21 (bail)	<b>7.26</b>	<10	<b>2,920</b>	8,400	1274.67
05/24/2016	GMW21 (PDB) 1276.86	<0.5	<1	<1	<3	1277.72
06/08/2016	GMW-21 (bail)	3.12	<1	<b>1,160</b>	2,770	1278.42
07/14/2016	GMW-21 (bail)	3.55	<1	<b>1,520</b>	5,210	1279.15
12/19/2016	GMW-21 (bail)	<2	<2	233	825	1278.39
04/13/2017	GMW-21 (bail)	2.21	<2	<b>1,170</b>	3,520	1278.10
06/08/2017	GMW21 (PDB) 1274.65	<2	<2	<2	<6	1278.97
06/08/2017	GMW-21 (bail)	<2	<2	455	1,450	1278.97
07/25/2017	GMW-21 (bail)	3.92	<0.187	<b>984</b>	3,010	1279.19
12/12/2017	GMW-21 (bail)	2.25	<2	<b>1,320</b>	4,310	1277.89
12/19/2017	GMW-21 (LF)	<20	<20	<b>1,570</b>	4,890	1277.65
04/05/2018	GMW-21 (bail)	3.36	<2	<b>2,160</b>	6,370	1277.36
12/05/2018	GMW-21 (LF)	2.10	<2	<b>1,590</b>	3,940	1285.67
04/24/2019	GMW-21 (LF)	<2	<2	<b>957</b>	2,480	1282.49
10/03/2019	GMW-21 (bail)	3.1	<1	<b>1,700</b>	4,900	1282.32
12/12/2019	GMW-21 (LF)	2.2	4.9	<b>1,300</b>	4,100	1281.83
02/10/2020	GMW-21 (LF)	1.5	<1	<b>700</b>	2,000	1280.94
05/11/2020	GMW-21 (LF)	<5	<10	170	680	1280.58
12/02/2015	GMW22 (PDB) 1273.90	1.94	<1	82	2,370	1274.59
03/07/2016	GMW-22-P1 1269.87	<b>10.5</b>	<10	<b>4,310</b>	<b>13,300</b>	1275.86

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
03/07/2016	GMW-22-P2 1268.37	1.54	<1	164	1,190	1275.86
03/07/2016	GMW-22-P3 1266.87	0.679	<1	4.28	55.1	1275.86
12/19/2016	GMW-22 (bail)	<b>6.93</b>	<2	<b>2,060</b>	9,340	1278.29
04/13/2017	GMW-22 (bail)	<b>5.86</b>	<2	<b>2,080</b>	8,860	1277.99
06/08/2017	GMW22 (PDB) 1274.67	<b>7.07</b>	<2	<b>1,770</b>	7,800	1278.86
06/08/2017	GMW-22 (bail)	<b>5.41</b>	<2	<b>1,420</b>	6,580	1278.86
12/12/2017	GMW-22 (bail)	2.70	<2	<20	2,280	1277.77
04/05/2018	GMW-22 (bail)	3.29	<2	411	2,500	1277.24
12/05/2018	GMW-22 (LF)	<2	<2	<2	24.5	1285.62
04/24/2019	GMW-22 (LF)	<2	<2	<2	15.2	1282.40
12/10/2019	GMW-22 (LF)	<2	<2	<2	<6	1281.48
03/26/2015	GMW25 (PDB) 1269.27	<0.5	<1	<1	<3	1273.11
05/13/2015	GMW25 (PDB) 1273.19	<0.5	<1	<1	<3	1273.19
10/12/2015	GMW25 (PDB) 1272.80	<0.5	<1	<1	<3	1273.25
10/12/2015	GMW-25 (bail)	<0.5	<1	33.5	110	1273.25
12/02/2015	GMW25 (PDB) 1272.69	<0.5	<1	<1	<3	1273.25
03/07/2016	GMW-25-P1 1272.87	<0.5	<1	<1	<3	1274.15
03/07/2016	GMW-25-P2 1271.37	<0.5	<1	<1	<3	1274.15
05/24/2016	GMW25 (PDB) 1274.87	<0.5	<1	<1	<3	1275.73
06/08/2016	GMW-25 (bail)	0.588	<1	9.7	74.5	1276.42
07/14/2016	GMW-25 (bail)	1.28	<1	8.62	462	1277.40
12/08/2016	GMW-25 (bail)	<2	<2	124	291	1276.77
04/13/2017	GMW-25 (bail)	<2	<2	53.2	102	1276.41
06/08/2017	GMW25 (PDB) 1274.95	<2	<2	19.3	94	1277.09
06/08/2017	GMW-25 (bail)	<2	<2	15.6	75.6	1277.09
07/25/2017	GMW-25 (bail)	<2	<2	41.3	118	1277.54
12/12/2017	GMW-25 (bail)	<2	<2	15.6	11.0	1276.29
12/19/2017	GMW-25 (LF)	<2	<2	13.2	11.6	1276.10
04/05/2018	GMW-25 (bail)	<2	<2	27.7	47.0	1276.29
12/05/2018	GMW-25 (LF)	<2	<2	66.5	178	1284.45
04/24/2019	GMW-25 (LF)	<2	<2	14.2	44.7	1280.83
12/09/2019	GMW-25 (LF)	<2	<2	6.9	12.5	1280.21
04/22/2020	GMW-25 (LF)	<2	<2	<2	6.91	1279.34
03/26/2015	GMW30 (PDB) 1267.46	<0.5	<1	20.1	437	1273.01
05/13/2015	GMW30 (PDB) 1273.08	<0.5	<1	2.66	59.2	1273.08
10/12/2015	GMW30 (PDB) 1272.52	3.87	<1	380	1,250	1273.18
10/12/2015	GMW-30 (bail)	1.93	<1	832	3,500	1273.18
12/03/2015	GMW-30-P1 1277.16	<0.5	<1	<1	<3	1273.15
12/03/2015	GMW-30-P2 1275.66	<0.5	<1	<1	<3	1273.15
12/03/2015	GMW-30-P3 1274.16	<0.5	<1	<1	<3	1273.15
12/03/2015	GMW-30-P4 1272.66	<0.5	<1	<1	<3	1273.15
12/03/2015	GMW-30 (bail)	2.40	<1	<b>1,040</b>	4,600	1273.15
03/07/2016	GMW-30-P1 1268.52	<0.5	<1	<1	<3	1274.01
03/07/2016	GMW-30-P2 1267.02	<0.5	<1	<1	<3	1274.01
05/24/2016	GMW30 (PDB) 1271.02	<0.5	<1	<1	<3	1275.59
06/08/2016	GMW-30 (bail)	<0.5	<1	<1	<3	1276.28
07/14/2016	GMW-30 (bail)	2.34	<1	35.9	66	1277.33

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
12/08/2016	GMW-30 (bail)	<2	<2	111	1,220	1276.67
04/13/2017	GMW-30 (bail)	<2	<2	67.4	950	1276.30
06/08/2017	GMW30 (PDB) 1272.52	<2	<2	<2	<6	1276.94
06/08/2017	GMW-30 (bail)	<2	<2	2.99	98.9	1276.94
07/25/2017	GMW-30 (bail)	<2	<2	6.42	57.7	1277.44
12/12/2017	GMW-30 (bail)	2.72	<2	433	2,910	1276.18
12/19/2017	GMW-30 (LF)	3.02	<2	448	3,310	1276.03
04/05/2018	GMW-30 (bail)	<2	<2	40.6	1,130	1275.50
12/05/2018	GMW-30 (LF)	<2	<2	2.75	7.0	1284.20
04/24/2019	GMW-30 (LF)	<2	<2	<2	<6	1280.43
12/09/2019	GMW-30 (LF)	<2	<2	<2	<6	1279.89
04/22/2020	GMW-30 (LF)	<2	<2	<2	<6	1278.87
03/26/2015	GMW33 (PDB) 1272.87	<b>5.27</b>	28.8	<b>2,780</b>	9,230	1274.73
05/13/2015	GMW33 (PDB) 1275.00	4.10	<100	<b>3,180</b>	9,510	1275.00
10/12/2015	GMW33 (PDB) 1274.50	<5	<10	<b>2,540</b>	3,240	1275.01
12/03/2015	GMW33 -P1 1274.51	<5	<10	<b>1,260</b>	1,460	1275.06
12/03/2015	GMW33- P2 1273.01	<5	<10	<b>1,200</b>	1,390	1275.06
12/03/2015	GMW-33 (bail)	<5	11.5	<b>2,800</b>	8,220	1275.06
03/07/2016	GMW33 (PDB) 1271.71	<50	<100	<b>2,040</b>	6,660	1276.53
05/24/2016	GMW33 (PDB) 1277.26	<0.5	<1	6.44	376	1278.40
06/08/2016	GMW-33 (bail)	1.91	1.43	145	308	1279.06
12/19/2016	GMW-33 (bail)	<2	<2	21	28	1278.86
06/08/2017	GMW33 (PDB) 1272.93	<2	<2	<2	<6	1279.49
06/08/2017	GMW-33 (bail)	<2	<2	<2	<6	1279.49
12/12/2017	GMW-33 (bail)	<2	<2	<2	<6	1278.33
12/19/2017	GMW-33 (LF)	<2	<2	35.8	95.7	1277.96
04/05/2018	GMW-33 (bail)	<2	<2	20.9	59.5	1277.76
12/05/2018	GMW-33 (LF)	<2	<2	<2	<6	1285.83
05/02/2019	GMW-33 (LF)	<2	<2	11.7	34.4	1283.18
12/10/2019	GMW-33 (LF)	<2	<2	6.7	18.2	1281.98
05/11/2020	GMW-33 (LF)	<2	<2	<2	<6	1281.03
03/26/2015	GMW34 (PDB) 1272.87	<0.5	<1	<1	<3	1275.17
05/13/2015	GMW34 (PDB) 1275.27	<0.5	<1	<1	<3	1275.27
12/02/2015	GMW34 (PDB) 1274.99	<0.5	<1	<1	<3	1275.31
05/24/2016	GMW34 (PDB) 1277.74	<0.5	<1	<1	<3	1278.55
12/19/2016	GMW-34 (bail)	<2	<2	<2	<6	1279.19
06/08/2017	GMW-34 (bail)	<2	<2	<2	<6	1279.55
12/12/2017	GMW-34 (bail)	<2	<2	<2	<6	1278.41
04/05/2018	GMW-34 (bail)	<2	<2	<2	<6	1277.93
03/26/2015	GMW35 (PDB) 1266.40	<0.5	<1	<1	<3	1270.11
05/13/2015	GMW35 (PDB) 1270.14	<0.5	<1	<1	<3	1270.14
10/12/2015	GMW35 (PDB) 1269.65	<0.5	<1	<1	<3	1270.03
10/12/2015	GMW-35 (bail)	<0.5	<1	<1	<3	1270.03
12/02/2015	GMW35 (PDB) 1269.43	<0.5	<1	<1	<3	1270.20
05/24/2016	GMW35 (PDB) 1271.88	<0.5	<1	<1	<3	1271.83
07/14/2016	GMW-35 (bail)	<0.5	<1	<1	<3	1273.15

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
12/08/2016	GMW-35 (bail)	<2	<2	<2	<6	1272.38
04/13/2017	GMW-35 (bail)	<2	<2	2.29	<6	1272.07
04/21/2017	GMW-35 (bail)	<2	<2	<2	<6	1272.06
07/25/2017	GMW-35 (bail)	<2	<2	<2	<6	1272.98
12/12/2017	GMW-35 (bail)	<2	<2	<2	<6	1271.94
04/05/2018	GMW-35 (bail)	<2	<2	<2	<6	1271.55
12/05/2018	GMW-35 (LF)	<2	<2	<2	<6	1278.74
04/24/2019	GMW-35 (LF)	<2	<2	<2	<6	1275.16
12/09/2019	GMW-35 (LF)	<2	<2	<2	<6	1274.71
04/22/2020	GMW-35 (LF)	<2	<2	2.40	10.7	1273.94
03/26/2015	GMW36 (PDB) 1267.79	<0.5	<1	<1	<3	1271.64
05/13/2015	GMW36 (PDB) 1271.71	<0.5	<1	<1	<3	1271.71
12/02/2015	GMW36 (PDB) 1270.85	<0.5	<1	<1	<3	1271.78
05/24/2016	GMW36 (PDB) 1273.35	<0.5	<1	<1	<3	1273.99
12/08/2016	GMW-36 (bail)	<2	<2	<2	<6	1275.14
04/13/2017	GMW-36 (bail)	<2	<2	<2	<6	1274.71
12/12/2017	GMW-36 (bail)	<2	<2	<2	<6	1274.53
04/05/2018	GMW-36 (bail)	<2	<2	<2	<6	1273.93
12/04/2018	GMW-36 (LF)	<2	<2	<2	<6	1282.59
04/24/2019	GMW-36 (LF)	<2	<2	<2	<6	1278.84
12/09/2019	GMW-36 (LF)	<2	<2	<2	<6	1278.37
04/22/2020	GMW-36 (LF)	<2	<2	2.48	11.2	1277.40
03/26/2015	GMW37 (PDB) 1267.96	<0.5	<1	<1	<3	1272.10
05/13/2015	GM-37 (PDB) 1272.10	<0.5	<1	<1	<3	1272.20
12/02/2015	GMW37 (PDB) 1271.50	<0.5	<1	<1	<3	1272.25
05/24/2016	GMW37 (PDB) 1273.75	<0.5	<1	<1	<3	1274.54
12/08/2016	GMW-37 (bail)	<2	<2	<2	<6	1275.78
04/13/2017	GMW-37 (bail)	<2	<2	<2	<6	1275.34
12/12/2017	GMW-37 (bail)	<2	<2	<2	<6	1275.17
04/05/2018	GMW-37 (bail)	<2	<2	<2	<6	1274.54
12/04/2018	GMW-37 (bail)	<2	<2	<2	<6	1283.14
04/24/2019	GMW-37 (LF)	<2	<2	<2	<6	1279.43
12/09/2019	GMW-37 (LF)	<2	<2	<2	<6	1278.90
04/22/2020	GMW-37 (LF)	<2	<2	3.56	16.1	1277.97
02/11/2016	GMW-38 (bail)	<1	<1	1.1	5.9	1272.95
03/07/2016	GMW38 (PDB) 1272.47	<0.5	<1	<1	<3	1273.28
12/08/2016	GMW-38 (bail)	<2	<2	<2	<6	1275.99
04/13/2017	GMW-38 (bail)	<2	<2	<2	<6	1275.58
12/12/2017	GMW-38 (bail)	<2	<2	<2	<6	1275.16
04/05/2018	GMW-38 (bail)	<2	<2	<2	<6	1274.55
12/04/2018	GMW-38 (LF)	<2	<2	<2	<6	1283.32
04/24/2019	GMW-38 (LF)	<2	<2	<2	<6	1279.54
12/09/2019	GMW-38 (LF)	<2	<2	<2	<6	1279.06
04/22/2020	GMW-38 (LF)	<2	<2	<2	8.5	1278.10
02/11/2016	GMW-39 (bail)	<1	1.1	<1	<3	1273.01
03/07/2016	GMW39 (PDB) 1272.54	<0.5	<1	<1	<3	1273.48
12/08/2016	GMW-39 (bail)	<2	<2	<2	<6	1276.05

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
04/13/2017	GMW-39 (bail)	<2	<2	<2	<6	1275.58
12/12/2017	GMW-39 (bail)	<2	<2	<2	<6	1275.19
04/05/2018	GMW-39 (bail)	<2	<2	<2	<6	1274.88
12/13/2018	GMW-39 (bail)	<2	<2	<2	<6	1283.67
04/24/2019	GMW-39 (bail)	<2	<2	7.4	18.8	1280.45
05/15/2019	GMW-39 (bail)	<2	<2	<2	<6	1281.72
12/09/2019	GMW-39 (LF)	<2	<2	<2	<6	1279.76
04/22/2020	GMW-39 (LF)	<2	<2	<2	9.05	1278.45
02/11/2016	GMW-40 (bail)	<1	<1	<1	<3	1273.84
03/07/2016	GMW40 (PDB) 1273.25	<0.5	<1	<1	<3	1274.27
12/08/2016	GMW-40 (bail)	<2	<2	<2	<6	1276.85
04/13/2017	GMW-40 (bail)	<2	<2	<2	<6	1276.48
12/12/2017	GMW-40 (bail)	<2	<2	<2	<6	1276.13
04/05/2018	GMW-40 (bail)	<2	<2	<2	<6	1275.59
12/04/2018	GMW-40 (LF)	<2	<2	<2	<6	1284.79
04/24/2019	GMW-40 (LF)	<2	<2	<2	<6	1281.02
12/09/2019	GMW-40 (LF)	<2	<2	<2	<6	1280.41
04/22/2020	GMW-40 (LF)	<2	<2	<2	7.61	1279.39
04/07/2016	GMW-41 (bail)	<0.5	<1	<1	<3	1274.09
12/08/2016	GMW-41 (bail)	<2	<2	<2	<6	1276.41
04/13/2017	GMW-41 (bail)	<2	<2	<2	<6	1275.99
12/12/2017	GMW-41 (bail)	<2	<2	<2	<6	1275.57
04/05/2018	GMW-41 (bail)	<2	<2	<2	<6	1274.96
12/04/2018	GMW-41 (LF)	<2	<2	<2	<6	1283.68
04/24/2019	GMW-41 (LF)	<2	<2	<2	<6	1280.02
12/09/2019	GMW-41 (LF)	<2	<2	<2	<6	1279.44
04/22/2020	GMW-41 (LF)	<2	<2	2.31	9.86	1278.57
04/07/2016	GMW-42 (bail)	<0.5	<1	<1	<3	1272.82
12/08/2016	GMW-42 (bail)	<2	<2	<2	<6	1274.76
04/13/2017	GMW-42 (bail)	<2	<2	<2	<6	1274.86
12/12/2017	GMW-42 (bail)	<2	<2	<2	<6	1274.02
04/05/2018	GMW-42 (bail)	<2	<2	<2	<6	1273.48
12/04/2018	GMW-42 (LF)	<2	<2	<2	<6	1282.18
04/24/2019	GMW-42 (LF)	<2	<2	<2	<6	1278.44
12/09/2019	GMW-42 (LF)	<2	<2	<2	<6	1278.04
04/22/2020	GMW-42 (LF)	<2	<2	2.03	8.73	1277.05
04/07/2016	GMW-44 (bail)	<0.5	<1	<1	<3	1276.27
12/08/2016	GMW-44 (bail)	<2	<2	<2	<6	1277.50
04/13/2017	GMW-44 (bail)	<2	<2	<2	<6	1277.16
12/12/2017	GMW-44 (bail)	<2	<2	<2	<6	1276.74
04/05/2018	GMW-44 (bail)	<2	<2	<2	<6	1276.19
12/04/2018	GMW-44 (LF)	<2	<2	<2	<6	1285.38
04/24/2019	GMW-44 (LF)	<2	<2	<2	<6	1281.67
12/09/2019	GMW-44 (LF)	<2	<2	<2	<6	1281.05
04/22/2020	GMW-44 (LF)	<2	<2	<2	7.55	1280.04
12/11/2019	RMW-1 (LF)	<2	<2	873	1,160	1283.06
02/11/2020	RMW-1 (LF)	1.8	5.4	540	810	1282.37

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
IDNR	MCL	5	1,000	700	10,000	
IDNR	NPG	64	5,000	3,500	50,000	
05/12/2020	RMW-1 (LF)	<0.5	1.3	1,700	2,100	1282.34
12/11/2019	RMW-2 (LF)	12.6	6,820	17,900	71,100	1283.05
02/11/2020	RMW-2 (LF)	8.7	3,100	19,000	73,000	1282.37
05/12/2020	RMW-2 (LF)	4.2	810	21,000	82,000	1282.24
12/12/2019	RMW-3 (LF)	32.3	4,260	17,900	65,700	1283.09
02/11/2020	RMW-3 (LF)	32	2,600	19,000	51,000	1282.21
05/12/2020	RMW-3 (LF)	33	5,800	22,000	74,000	1282.09
12/12/2019	RMW-4 (LF)	<8.70	3,750	17,800	51,700	1282.89
02/11/2020	RMW-4 (LF)	9.7	2,300	19,000	48,000	1282.14
05/12/2020	RMW-4 (LF)	<5	3,500	20,000	54,000	1282.04
10/12/2015	MW1 (PDB) 1279.00	<0.5	<1	<1	<3	1279.29
10/12/2015	MW1 (bail)	<0.5	<1	<1	<3	1279.29
12/02/2015	MW1 (PDB) 1278.60	<0.5	<1	<1	<3	1280.05
07/14/2016	MW1 (bail)	<0.5	<1	<1	<3	1282.80
12/19/2016	MW1 (bail)	<2	<2	<2	<6	1282.62
07/25/2017	MW1 (bail)	<2	<2	<2	<6	1282.45
12/12/2017	MW1 (bail)	<2	<2	<2	<6	1282.06
12/04/2018	MW1 (LF)	<2	<2	<2	<6	1285.12
12/10/2019	MW1 (LF)	<2	<2	<2	<6	1284.20
12/11/2019	MW3 (bail)	<2	<2	<2	<6	1278.46
02/10/2020	MW3 (bail)	<0.5	<1	<1	<3	1278.25
05/12/2020	MW3 (bail)	<0.5	<1	<1	<3	1278.55
12/02/2015	MW4R (PDB)	62.7	13,400	18,100	89,700	1276.26
10/12/2015	MW5 (PDB) 1274.79	<0.5	<1	<1	<3	1274.90
10/12/2015	MW5 (bail)	<0.5	<1	<1	<3	1274.90
12/02/2015	MW5 (PDB) 1274.29	<0.5	<1	<1	<3	1274.93
07/14/2016	MW5 (bail)	<0.5	<1	<1	<3	1279.35
12/19/2016	MW5 (bail)	<2	<2	<2	<6	1278.53
07/25/2017	MW5 (bail)	<2	<2	<2	<6	1279.33
12/12/2017	MW5 (bail)	<2	<2	<2	<6	1277.81
12/05/2018	MW5 (LF)	<2	<2	<2	<6	1285.50
12/10/2019	MW5 (LF)	<2	<2	<2	<6	1281.51
05/06/2019	TC-2 (bail)	<2	<2	66.1	217	1284.49
12/11/2019	TC-2 (bail)	<2	4.42	122	404	1283.26
03/26/2015	TC-6D (PDB) 1266.88	10.1	<10	2,510	7,530	1275.86
05/13/2015	TC-6D (PDB) 1275.95	5.28	<1	961	3,420	1275.95
12/03/2015	TC-6D (PDB) 1268.38	27.5	268	9,340	32,700	1276.05
12/03/2015	TC-6D (bail)	24.9	355	12,800	50,000	1276.05
05/24/2016	TC-6D (PDB) 1268.38	10.2	<1	3,550	9,610	1279.17
12/19/2016	TC-6D (bail)	9.32	2.91	10,400	33,700	1279.35
06/08/2017	TC-6D (bail)	7.18	2.91	7,300	22,400	1280.23
07/25/2017	TC-6D (bail)	8.79	46	10,800	35,300	1280.22
12/12/2017	TC-6D (bail)	<20	<20	6,960	21,600	1278.90
04/05/2018	TC-6D (bail)	11.6	<3.74	4,940	18,700	1278.35
12/06/2018	TC-6D (LF)	7.17	97.6	6,700	20,700	1285.59

**TABLE 2**  
**2015 – 2020 GROUNDWATER ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Groundwater Elevation (ft ASL)
<i>IDNR</i>	<i>MCL</i>	5	1,000	700	10,000	
<i>IDNR</i>	<i>NPG</i>	64	5,000	3,500	50,000	
06/20/2019	TC-6D (bail)	3.71	4.46	3,690	12,200	1286.18
12/11/2019	TC-6D (bail)	3.66	<2	3,570	10,200	1282.61
05/11/2020	TC-6D (LF)	<17.4	<17.6	8,350	23,200	1281.58
12/02/2015	TC-6S (bail)	<0.5	<1	<1	<3	1298.40
12/19/2016	TC-6S (bail)	<2	<2	<2	<6	1303.12
05/13/2015	TC-7 (PDB) 1277.50	<0.5	<1	<1	<3	1277.60
12/02/2015	TC-7 (PDB) 1273.01	<0.5	<1	<1	<3	1278.18
12/19/2016	TC-7 (bail)	<2	<2	<2	<6	1279.54
07/25/2017	TC-7 (bail)	<2	<2	<2	<6	1279.13
12/13/2017	TC-7 (bail)	<2	<2	<2	<6	1279.03
12/06/2018	TC-7 (bail)	<7.90	161	10,300	17,500	1282.56
12/11/2019	TC-7 (LF)	4.66	106	10,400	28,300	1281.57
02/11/2020	TC-7 (LF)	17	56	13,000	33,000	1281.05
05/12/2020	TC-7 (LF)	3.0	1.5	5,200	8,700	1280.99
12/19/2018	TC-10 (bail)	<b>15.6</b>	6.54	<b>5,700</b>	3,760	1282.15
02/11/2020	TC-10 (bail)	<b>17</b>	350	<b>7,700</b>	9,500	1280.71
05/12/2020	TC-10 (bail)	<b>16</b>	790	<b>6,400</b>	<b>14,000</b>	1280.71
03/02/2017	TC-17D (bail)	3.48	2.12	<b>1,490</b>	3,800	1279.21
12/12/2017	TC-17D (bail)	3.56	<2	<b>860</b>	1,680	1279.21
12/06/2018	TC-17D (LF)	4.63	<2	<b>2,390</b>	4,850	1285.84
12/12/2019	TC-17D (bail)	<2	<2	21	27.7	1282.82
12/02/2015	TC-22D (bail)	<0.5	<1	<1	<3	1276.06
12/19/2016	TC-22D (bail)	<2	<2	<2	<6	1279.94
12/12/2017	TC-22D (bail)	<2	<2	<2	<6	1279.44
12/06/2018	TC-22D (LF)	<2	<2	2.58	6.81	1285.91
12/11/2019	TC-22D (bail)	<2	<2	<2	<6	1282.89
12/02/2015	TC-22S (bail)	<0.5	<1	<1	<3	1294.25
12/02/2015	TC-23 (PDB) 1263.60	<0.5	<1	<1	<3	1275.21
12/19/2016	TC-23 (bail)	<2	<2	<2	<6	1278.94
12/12/2017	TC-23 (bail)	<2	<2	<2	<6	1278.49
12/04/2018	TC-23 (LF)	<2	<2	<2	<6	1285.76
12/10/2019	TC-23 (LF)	<2	<2	<2	<6	1282.05

Notes: PDB = passive diffusion bag

LF = low flow sampling

MCL = Maximum Contaminant Level (applicable for an Iowa Protected Groundwater Source)

NPG = Iowa Statewide Standard for Non-Protected Groundwater Source

**Bold** concentrations exceed MCL (maximum contaminant level)

<0.5 PDB was not within screened section of the well

PDB sample elevations shown in table are top of PDB – PDBs used at site were approximately 1.5 feet in length

**TABLE 3 - GROUNDWATER METALS ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)
IDNR	MCL	0.01000	0.00500	0.10000	0.01500	0.00200
IDNR	NPG	0.05000	0.02500	0.50000	0.07500	0.01000
12/23/1999	GMW-4	<b>0.010</b>	0.0005	0.020	<b>0.024</b>	<0.0002
05/13/2015	GMW-4	<0.002	<0.0005	<0.005	<0.0005	<0.0002
05/24/2016	GMW-4	<0.002	<0.0005	0.00705	<0.0005	<0.0002
07/25/2017	GMW-4	<0.002	<0.0005	<0.005	0.000536	<0.0002
06/15/2018	GMW-4	<0.002	<0.0005	<0.005	<0.0005	<0.0002
06/24/2019	GMW-4	0.00209	<0.0005	<0.005	<0.0005	<0.0002
12/11/2019	GMW-4	<0.002	<0.0001	<0.005	<0.0005	<0.0002
05/12/2020	GMW-4	<0.002	0.000179	<0.005	<0.0005	<0.0002
05/13/2015	TC-7	<0.002	<0.0005	<0.005	<0.0005	<0.0002
05/24/2016	TC-7	<0.002	<0.0005	<0.005	<0.0005	<0.0002
07/25/2017	TC-7	0.00412	<0.0005	<0.005	<0.0005	<0.0002
06/14/2018	TC-7	<0.002	<0.0005	<0.005	<0.0005	<0.0002
06/24/2019	TC-7	<b>0.0112</b> /0.00236	<0.0005	<0.005	<0.0005	<0.0002
12/11/2019	TC-7	<b>0.0121</b>	<0.0001	<0.005	<0.0005	<0.0002
05/12/2020	TC-7	0.00853	<0.0001	<0.005	<0.0005	<0.0002
12/11/2019	RMW-1	0.00304	<0.0001	<0.005	<0.0005	<0.0002
05/12/2020	RMW-1	0.00241	<0.0001	<0.005	<0.0005	<0.0002
12/11/2019	RMW-2	0.00861	<0.0001	<0.005	<0.0005	<0.0002
05/12/2020	RMW-2	0.00697	<0.0001	<0.005	<0.0005	<0.0002
12/12/2019	RMW-3	0.00836	<0.0001	<0.005	<0.0005	<0.0002
05/12/2020	RMW-3	0.00647	<0.0001	<0.005	<0.0005	<0.0002
12/12/2019	RMW-4	0.00930	<0.0001	<0.005	<0.0005	<0.0002
05/12/2020	RMW-4	0.00459	<0.0001	<0.005	<0.0005	<0.0002
11/06/2009	GMW-7R	<0.01	<0.001	<0.01	<0.01	<0.001
10/06/2010	GMW-7R	0.00604	<0.0005	<0.002	<0.004	<0.0002
09/27/2011	GMW-7R	0.00513	<0.0005	<0.002	<0.004	<0.0002
09/26/2012	GMW-7R	0.00575	<0.0005	<0.005	0.00266	<0.000267
09/25/2013	GMW-7R	0.00820	<0.0005	<0.005	<0.0005	<0.0002
10/29/2014	GMW-7R	0.00707	<0.0005	<0.005	<0.0005	<0.0002
05/13/2015	GMW-7R	0.00996	<0.0005	<0.005	<0.0005	<0.0002
05/24/2016	GMW-7R	<0.002	<0.0005	<0.005	<0.0005	<0.0002
07/25/2017	GMW-7R	<0.002	<0.0005	<0.005	<0.0005	<0.0002
06/14/2018	GMW-7R	<0.002	<0.0005	<0.005	<0.0005	<0.0002
06/20/2019	GMW-7R	0.00393	<0.0005	<0.005	<0.0005	<0.0002
05/11/2020	GMW-7R	0.00373	<0.0001	<0.005	<0.0005	<0.0002
12/22/2005	GMW-9R	<b>0.091</b>	0.002	0.070	<b>0.060</b>	0.0007
11/13/2006	GMW-9R	<b>0.010</b>	<0.001	0.010	<0.01	<0.0002
11/19/2007	GMW-9R	<b>0.050</b>	0.002	0.060	<b>0.040</b>	<0.0002
12/18/2008	GMW-9R	<b>0.020</b>	<0.001	<0.01	<0.01	<0.001
11/06/2009	GMW-9R	<0.01	<0.001	<0.01	<0.01	<0.001
10/05/2010	GMW-9R	0.00898	<0.0005	<0.002	<0.004	<0.0002
09/27/2011	GMW-9R	<b>0.0248</b>	<0.0005	<0.002	<0.004	<0.0002
09/26/2012	GMW-9R	<b>0.0252</b>	<0.0005	<0.005	0.00506	<0.000267

**TABLE 3 - GROUNDWATER METALS ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)
IDNR	MCL	0.01000	0.00500	0.10000	0.01500	0.00200
IDNR	NPG	0.05000	0.02500	0.50000	0.07500	0.01000
09/25/2013	GMW-9R	<b>0.0272</b>	<0.0005	<0.005	<0.0005	<0.0002
10/29/2014	GMW-9R	<b>0.0203</b>	<0.0005	<0.005	<0.0005	<0.0002
05/13/2015	GMW-9R	0.00663	<0.0005	<0.005	<0.0005	<0.0002
05/24/2016	GMW-9R	<0.002	<0.0005	<0.005	<0.0005	<0.0002
07/25/2017	GMW-9R	0.00509	<0.0005	<0.005	<0.0005	<0.0002
06/14/2018	GMW-9R	0.00499	<0.0005	<0.005	<0.0005	<0.0002
06/24/2019	GMW-9R	<0.002	<0.0005	<0.005	<0.0005	<0.0002
05/11/2019	GMW-9R	0.00394	<0.0001	<0.005	<0.0005	<0.0002
03/29/2002	GMW-13	<0.01	0.004	<b>0.160</b>	<b>0.290</b>	<b>0.0092</b>
06/27/2002	GMW-13	<0.01	<0.001	0.010	<b>0.020</b>	<b>0.0105</b>
09/26/2002	GMW-13	<0.01	<0.001	0.040	<b>0.050</b>	<b>0.010</b>
12/11/2002	GMW-13	<b>0.010</b>	0.004	0.060	<b>0.080</b>	<b>0.010</b>
03/26/2003	GMW-13	<0.01	0.002	0.070	<b>0.090</b>	<b>0.010</b>
06/12/2003	GMW-13	<0.01	0.002	0.060	<b>0.090</b>	<b>0.009</b>
08/29/2003	GMW-13	<0.01	0.001	0.030	<b>0.040</b>	<b>0.007</b>
12/02/2003	GMW-13	<0.01	<0.006	<0.01	<b>0.050</b>	<b>0.020</b>
03/24/2004	GMW-13	<0.01	0.001	0.040	<b>0.060</b>	<b>0.040</b>
06/25/2004	GMW-13	<0.01	<0.001	0.020	<b>0.030</b>	<b>0.030</b>
09/27/2004	GMW-13	<0.01	<0.001	0.020	0.010	<b>0.030</b>
12/14/2004	GMW-13	<0.01	0.001	0.020	<b>0.050</b>	<b>0.040</b>
03/15/2005	GMW-13	<b>0.010</b>	0.002	0.040	<b>0.070</b>	<b>0.030</b>
06/20/2005	GMW-13	0.009	0.002	0.010	<b>0.050</b>	<b>0.390</b>
12/22/2005	GMW-13	0.005	0.001	0.010	0.010	0.0002
05/13/2015	GMW-13	<0.002	<0.0005	<0.005	<0.0005	0.000264
05/24/2016	GMW-13	0.00239	<0.0005	<0.005	<0.0005	<0.0002
07/25/2017	GMW-13	0.00213	<0.0005	<0.005	<0.0005	<0.0002
06/14/2018	GMW-13	0.00400	<0.0005	<0.005	<0.0005	<0.0002
06/20/2019	GMW-13	0.00364	<0.0005	<0.005	<0.0005	<0.0002
01/16/2020	GMW-13	0.00536	<0.0001	<0.005	<0.0005	<0.0002
05/11/2020	GMW-13	0.00467	<0.0001	<0.005	<0.0005	<0.0002
03/29/2002	GMW-14	<0.01	<b>0.006</b>	<b>0.16</b>	<b>0.090</b>	<b>0.0197</b>
06/27/2002	GMW-14	<b>0.020</b>	<0.001	0.04	0.010	<b>0.0062</b>
09/26/2002	GMW-14	<b>0.030</b>	0.002	0.08	<b>0.030</b>	<b>0.038</b>
12/11/2002	GMW-14	<b>0.020</b>	0.003	0.07	<b>0.020</b>	<b>0.020</b>
03/26/2003	GMW-14	<b>0.030</b>	0.004	<b>0.11</b>	<b>0.050</b>	<b>0.030</b>
06/12/2003	GMW-14	<0.01	<0.001	0.01	<0.01	<b>0.010</b>
08/29/2003	GMW-14	<0.01	0.001	0.04	<0.01	<b>0.007</b>
06/25/2004	GMW-14	<0.01	<0.001	0.02	<0.01	<b>0.009</b>
03/21/2019	GMW-14	0.0038	<0.0005	<0.005	<0.0005	0.000248
06/24/2019	GMW-14	<0.002	<0.0005	<0.005	<0.0005	<0.0002
09/27/2019	GMW-14	0.0022	<0.0001	<0.005	<0.0005	<0.0002
12/12/2019	GMW-14	<0.002	<0.0001	<0.005	<0.0005	<0.0002
05/11/2020	GMW-14	0.00354	<0.0001	0.00754	<0.0005	0.000224
11/06/2009	GMW-15	<0.01	<0.001	<0.01	<0.01	<0.001
11/06/2009	GMW-15	0.0080	<0.001	<0.01	<0.001	<0.00005
10/08/2010	GMW-15	<b>0.0212</b>	<0.0005	0.00205	<0.004	<0.0002
09/27/2011	GMW-15	<b>0.0171</b>	<0.0005	<0.002	<0.004	<0.0002
09/26/2012	GMW-15	<b>0.0246</b>	<0.0005	<0.005	0.00355	<0.000267

**TABLE 3 - GROUNDWATER METALS ANALYTICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Sample Date	Well #	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)
IDNR	MCL	<b>0.01000</b>	<b>0.00500</b>	<b>0.10000</b>	<b>0.01500</b>	<b>0.00200</b>
IDNR	NPG	<b>0.05000</b>	<b>0.02500</b>	<b>0.50000</b>	<b>0.07500</b>	<b>0.01000</b>
09/25/2013	GMW-15	<b>0.0213</b>	<0.0005	<0.005	<0.0005	<0.0002
10/29/2014	GMW-15	<b>0.0194</b>	<0.0005	<0.005	<0.0005	<0.0002
05/13/2015	GMW-15	<b>0.0187</b>	<0.0005	<0.005	<0.0005	<0.0002
05/24/2016	GMW-15	<0.002	<0.0005	<0.005	<0.0005	<0.0002
07/25/2017	GMW-15	<0.002	<0.0005	<0.005	<0.0005	<0.0002
06/14/2018	GMW-15	<0.002	<0.0005	<0.005	<0.0005	<0.0002
06/24/2019	GMW-15	<0.002	<0.0005	<0.005	<0.0005	<0.0002
05/11/2020	GMW-15	<0.002	<0.0001	<0.005	<0.0005	<0.0002
12/23/1999	MW-1	<0.005	<0.0005	<0.01	0.002	<0.0002
12/11/2002	MW-1	<0.01	<0.001	<0.01	<0.01	<0.0002
03/26/2003	MW-1	<0.01	<0.001	<0.01	<0.01	<0.0002
06/12/2003	MW-1	<0.01	<0.001	<0.01	<0.01	<0.0002
08/29/2003	MW-1	<0.01	<0.001	<0.01	<0.01	<0.0002
12/02/2003	MW-1	<0.01	<0.006	<0.01	<0.03	<0.0002
03/24/2004	MW-1	<0.01	<0.001	<0.01	<0.01	<0.0002
06/25/2004	MW-1	<0.01	<0.001	<0.01	<0.01	<0.0002
09/27/2004	MW-1	<0.01	<0.001	<0.01	<0.01	<0.0002
12/14/2004	MW-1	<0.01	<0.001	<0.01	<0.01	<0.0002
03/16/2005	MW-1	<0.01	<0.001	<0.01	<0.01	<0.0002
06/20/2005	MW-1	<0.005	<0.001	<0.01	<0.01	<0.0002
03/26/2003	TC-6D	<b>0.010</b>	<0.001	<0.01	<0.01	<0.0002
06/12/2003	TC-6D	<0.01	<0.001	0.020	<0.01	<0.0002
08/29/2003	TC-6D	<0.01	<0.001	0.010	<0.01	<0.0002
12/02/2003	TC-6D	<b>0.020</b>	<0.01	<0.01	<0.03	<0.0002
03/24/2004	TC-6D	<0.01	<0.001	0.030	<0.01	<0.0002
06/25/2004	TC-6D	<0.01	<0.001	0.040	<0.01	<0.0002
09/27/2004	TC-6D	<b>0.010</b>	<0.001	0.050	<0.01	<0.0002
12/14/2004	TC-6D	<0.01	<0.001	0.030	<0.01	<0.0002
03/16/2005	TC-6D	<0.01	<0.001	0.020	<0.01	<0.0002
06/20/2005	TC-6D	<b>0.017</b>	<0.001	0.010	<0.01	<0.0002
12/22/2005	TC-6D	<b>0.015</b>	<0.001	<0.01	<0.01	<0.0002
11/13/2006	TC-6D	<b>0.020</b>	<0.001	<0.01	<0.01	<0.0002
11/19/2007	TC-6D	<b>0.020</b>	<0.001	<0.01	<0.01	<0.0002
12/18/2008	TC-6D	<b>0.020</b>	<0.001	<0.01	<0.01	<0.001
11/06/2009	TC-6D	<0.10	<0.001	<0.01	<0.01	<0.001
10/05/2010	TC-6D	<b>0.0188</b>	<0.0005	<0.002	<0.004	<0.0002
09/27/2011	TC-6D	<b>0.0140</b>	<0.0005	<0.002	<0.004	<0.0002
09/26/2012	TC-6D	<b>0.0171</b>	<0.0005	<0.005	<0.0005	<0.000267
09/25/2013	TC-6D	<b>0.0151</b>	<0.0005	<0.005	<0.0005	<0.0002
10/29/2014	TC-6D	<b>0.0117</b>	<0.0005	<0.005	<0.0005	<0.0002
05/13/2015	TC-6D	0.00601	<0.0005	<0.005	<0.0005	<0.0002
05/24/2016	TC-6D	0.00442	<0.0005	<0.005	<0.0005	<0.0002
07/25/2017	TC-6D	0.00453	<0.0005	<0.005	0.00253	<0.0002
06/14/2018	TC-6D	<0.002	<0.0005	<0.005	<0.0005	<0.0002
06/20/2019	TC-6D	0.00468	<0.0005	<0.005	<0.0005	<0.0002
05/11/2020	TC-6D	0.00628	<0.0001	<0.005	<0.0005	<0.0002

**Bold numbers = exceeds MCL limits**

MCL = Maximum Contaminant Level for a protected groundwater source; NPG = Non-protected Groundwater

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
<b>ON-SITE MONITORING WELLS</b>								
GMW-1	07/25/2017	7.00	11.88	1147	745	1.43	7.46	108
GMW-1	07/10/2018	5.18	14.36	1222	794	1.76	7.21	78.4
GMW-1	02/11/2020	6.03	7.86	943	599	4.21	6.84	-69
GMW-1	05/12/2020	6.09	7.80	837	545	4.18	7.20	-56
GMW-3	01/28/2016	15.88	10.08	725	472	8.93	7.1	41
GMW-3	04/16/2016	14.32	7.52	766	498	10.14	6.91	169
GMW-3	07/14/2016	13.59	10.81	707	459	7.65	7.65	175
GMW-3	12/28/2016	13.59	11.44	709	461	10.25	7.57	99.4
GMW-3	07/25/2017	14.11	10.44	733	477	11.97	7.04	136
GMW-3	11/30/2017	14.50	12.12	744	484	8.47	7.05	108
GMW-3	07/10/2018	11.65	9.27	671	436	17.00	7.47	77
GMW-3	12/06/2018	10.12	12.88	750	488	5.94	7.43	31
GMW-4	01/28/2016	8.12	6.55	1108	721	9.56	7.12	7
GMW-4	07/14/2016	6.64	14.15	533	348	5.78	7.78	166
GMW-4	12/28/2016	6.45	7.14	627	407	7.62	7.40	88.7
GMW-4	07/24/2017	7.12	16.18	468	304	6.24	7.12	120
GMW-4	11/30/2017	7.27	9.48	545	354	7.93	7.01	138
GMW-4	07/10/2018	5.26	17.33	468	304	9.10	7.47	71.0
GMW-4	12/06/2018	4.56	8.46	795	512	0.86	7.54	-15.2
GMW-4	12/11/2019	5.51	8.25	856	542	0.63	6.91	93
GMW-4	02/11/2020	6.05	5.84	830	528	1.40	6.53	37
GMW-4	05/12/2020	6.11	8.50	806	525	0.35	7.17	87
GMW-6	01/28/2016	38.67	9.4	850	551	6.71	6.92	183
GMW-6	04/12/2016	37.32	10.17	872	567	4.14	7.50	22
GMW-6	12/28/2016	35.68	9.57	908	5.9	5.95	7.54	65
GMW-6	07/24/2017	35.01	9.90	883	574	7.95	7.39	96
GMW-6	11/30/2017	36.29	9.80	903	587	6.08	6.95	120
GMW-6	12/10/2019	32.74	10.85	1071	680	7.93	7.01	134
GMW-7R	06/29/2009	40.96	10.25	530	---	1.06	7.3	-192
GMW-7R	09/17/2009	40.02	12.84	542	---	1.01	7.07	-178
GMW-7R	11/06/2009	39.71	13.01	565	---	1.84	6.84	-164.5
GMW-7R	05/10/2010	38.61	9.50	898	---	1.58	7.64	2.2
GMW-7R	06/24/2010	38.29	9.48	833	---	1.78	6.73	80.3
GMW-7R	10/20/2010	35.29	9.37	783	---	2.1	8.0	-26.9
GMW-7R	06/02/2011	36.59	9.91	673	---	6.29	7.61	50.1
GMW-7R	07/24/2012	40.90	10.61	474	---	3.1	6.8	-142
GMW-7R	07/24/2013	42.38	10.70	776	---	3.7	7.7	---
GMW-7R	08/20/2014	42.92	12.14	335	---	1.45	6.87	---
GMW-7R	10/12/2015	42.52	9.78	800	---	1.7	7.52	-97.6
GMW-7R	12/03/2015	42.48	9.21	773	---	2.2	7.54	-79.3
GMW-7R	01/28/2016	41.82	9.27	790	514	1.71	7.17	-24
GMW-7R	02/11/2016	41.74	8.85	779	506	1.73	7.45	-94
GMW-7R	04/12/2016	40.58	9.40	833	542	0.97	7.19	71
GMW-7R	05/05/2016	40.02	9.98	846	550	0.58	7.47	49

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
GMW-7R	07/14/2016	38.12	9.83	917	531	0.61	8	46
GMW-7R	12/28/2016	38.74	9.42	793	516	0.57	7.6	-98.1
GMW-7R	07/24/2017	38.03	9.89	799	519	6.51	7.09	62
GMW-7R	11/30/2017	39.37	9.49	830	539	1.32	7.16	23.8
GMW-7R	04/05/2018	39.83	9.62	837	544	1.25	5.68	4
GMW-7R	07/10/2018	37.32	9.88	933	607	1.43	6.80	99.8
GMW-7R	12/05/2018	31.73	10.75	807	525	0.38	7.21	-113
GMW-7R	10/03/2019	34.96	9.74	794	516	1.81	7.22	-93
GMW-7R	12/12/2019	35.41	10.54	808	516	0.65	7.19	-36
GMW-7R	02/10/2020	36.34	10.90	810	517	1.41	7.05	-68
GMW-7R	05/11/2020	36.71	11.50	770	501	0.03	7.28	-237
GMW-8	01/28/2016	35.02	9.47	824	536	4.7	7.06	-57
GMW-8	04/12/2016	33.52	10.50	897	583	6.07	7.33	69
GMW-8	07/14/2016	31.97	10.67	600	390	10.26	7.77	105
GMW-8	12/28/2016	32.28	10.26	888	578	7.75	7.59	41.2
GMW-8	07/25/2017	32.05	10.54	566	367	8.55	7.06	86
GMW-8	11/30/2017	32.98	10.49	1025	667	7.52	6.87	123
GMW-8	07/10/2018	30.31	10.40	1035	673	11.54	7.22	84.2
GMW-8	12/04/2018	26.52	10.70	1052	684	7.34	7.22	186
GMW-8	12/10/2019	29.70	10.65	1087	695	5.72	6.90	106
GMW-9R	06/29/2009	24.03	10.82	618	---	1.31	7.14	-167
GMW-9R	09/17/2009	24.61	12.63	603	---	1.11	7.01	-152
GMW-9R	11/06/2009	22.03	12.97	579	---	1.15	6.81	-136.9
GMW-9R	05/10/2010	21.29	9.92	1127	---	1.89	7.42	-11.1
GMW-9R	06/24/2010	20.97	9.62	848	---	1.93	7.07	45
GMW-9R	10/20/2010	18.77	10.79	905	---	1.94	7.4	-19.8
GMW-9R	06/02/2011	19.19	9.95	543	---	14.09	7.77	59
GMW-9R	07/24/2012	23.88	11.29	522	---	3.31	6.93	-102
GMW-9R	07/24/2013	25.13	13.53	1110	---	4.25	7.89	---
GMW-9R	08/20/2014	25.61	11.60	881	---	0.71	6.02	---
GMW-9R	10/12/2015	25.48	10.70	864	---	1.4	7.40	-128.7
GMW-9R	12/03/2015	25.17	9.95	993	---	3.21	7.23	-77.4
GMW-9R	01/28/2016	24.41	10.69	1902	1043	1.35	6.77	-11
GMW-9R	04/12/2016	22.85	9.29	1278	831	3.21	6.97	124
GMW-9R	05/05/2016	21.67	9.49	867	563	1	6.98	75
GMW-9R	07/14/2016	21.33	10.49	1143	743	0.50	7.58	17.5
GMW-9R	12/28/2016	21.64	10.57	1447	941	2.06	7.05	24.1
GMW-9R	07/25/2017	21.42	9.58	1249	810	2.75	7.16	-18
GMW-9R	11/30/2017	22.35	11.01	959	623	1.93	6.84	-42
GMW-9R	04/05/2018	22.39	9.43	1300	846	2.03	5.40	-2
GMW-9R	07/10/2018	19.42	8.68	1240	806	2.47	7.03	71.8
GMW-9R	12/06/2018	15.36	10.30	1179	767	0.59	6.80	14.2
GMW-9R	05/02/2019	16.55	7.74	1148	489	5.80	6.99	132
GMW-9R	12/11/2019	16.32	10.23	1167	744	0.78	6.63	-26
GMW-9R	05/11/2020	19.59	11.70	1073	696	0.05	7.03	-73

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
GMW-10R	12/02/2015	26.1	9.40	900	---	3.24	7	-2
GMW-10R	01/28/2016	25.36	10.29	975	635	4.17	7.03	6
GMW-10R	04/12/2016	23.61	9.42	720	468	6.94	7.28	101
GMW-10R	05/05/2016	22.38	9.47	712	463	4.75	7.07	84
GMW-10R	07/14/2016	22.18	10.08	845	549	7.35	7.46	123
GMW-10R	12/28/2016	22.69	10.62	795	517	7.45	7.45	52.5
GMW-10R	07/24/2017	22.62	9.23	891	579	11.40	6.90	120
GMW-10R	11/30/2017	23.41	10.58	897	583	8.28	6.70	87.4
GMW-10R	04/05/2018	23.48	9.48	613	398	7.40	5.49	65
GMW-10R	07/10/2018	20.37	9.16	806	523	9	7.32	63.6
GMW-10R	12/06/2018	17.03	10.92	873	567	5.97	7.12	88.4
GMW-10R	05/02/2019	17.99	7.95	772	502	3.18	7.08	210
GMW-10R	10/03/2019	18.31	10.32	946	615	3.30	6.90	152
GMW-10R	12/12/2019	18.55	10.02	998	635	2.31	6.80	112
GMW-10R	02/10/2020	20.12	11.04	920	588	2.28	6.83	81
GMW-10R	05/11/2020	20.15	12.50	887	577	0.76	7.06	99
GMW-11	01/28/2016	27.45	10.2	795	517	9.91	7.24	-70
GMW-11	04/12/2016	25.97	10.55	819	532	1.52	7.52	-13
GMW-11	07/14/2016	24.20	10.03	812	528	1.47	7.89	17
GMW-11	12/28/2016	24.75	10.57	772	502	2.71	7.83	2.7
GMW-11	07/25/2017	24.26	10.02	790	513	3.15	7.02	43
GMW-11	11/30/2017	25.38	10.57	798	519	2.83	7.07	95.7
GMW-11	07/10/2018	22.98	9.78	835	542	1.81	7.33	62.3
GMW-11	12/06/2018	18.90	10.70	818	532	0.39	7.29	36.2
GMW-11	10/03/2019	20.93	10.75	951	618	5.76	7.14	142
GMW-11	12/12/2019	21.42	11.00	938	599	6.58	6.99	51
GMW-11	02/10/2020	22.41	11.13	911	582	10.44	7.12	87
GMW-11	05/11/2020	22.80	11.10	866	562	7.11	7.29	218
GMW-13	06/29/2009	18.14	9.47	668	---	1.09	7.03	-83
GMW-13	09/17/2009	18.47	11.37	622	---	0.81	6.91	-98.5
GMW-13	11/06/2009	16.70	12.93	566	---	1.04	6.79	-114
GMW-13	05/10/2010	15.97	8.78	1091	---	1.72	7.3	7.48
GMW-13	06/24/2010	15.65	9.34	1113	---	2.25	6.82	63.7
GMW-13	10/20/2010	14.19	11.95	1050	---	1.58	7.3	-18.1
GMW-13	06/02/2011	13.78	9.11	683	---	6.51	7.48	10.5
GMW-13	07/24/2012	18.22	12.17	535	---	4.08	6.72	-12.9
GMW-13	07/24/2013	14.07	11.14	860	---	3.94	7.84	---
GMW-13	08/20/2014	19.52	10.5	831	---	1.96	5.65	---
GMW-13	10/12/2015	19.57	11.4	909	---	2.18	7.18	-33
GMW-13	12/03/2015	18.95	10.7	937	---	4.4	6.96	-18.7
GMW-13	01/28/2016	18.31	10.5	922	599	0.91	6.98	-40
GMW-13	04/12/2016	16.74	8.93	924	601	0.47	7.01	-1
GMW-13	07/14/2016	15.88	10.1	1013	658	0.47	8.1	-30
GMW-13	12/28/2016	16.02	10.65	944	614	0.57	7.16	-46.8
GMW-13	07/25/2017	16.32	9.86	1074	698	1.73	7.47	-43
GMW-13	11/30/2017	16.82	11.38	987	641	1.05	6.88	-33
GMW-13	07/10/2018	14.10	9.44	846	550	1.6	7.41	13.1

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
GMW-13	12/06/2018	12.18	11.21	812	528	0.39	7.59	-107
GMW-13	10/03/2019	12.63	11.04	948	616	1.70	7.08	-95
GMW-13	12/12/2019	13.95	10.92	938	599	0.73	6.70	-69
GMW-13	02/10/2020	14.82	10.18	864	551	2.50	6.79	-86
GMW-13	05/11/2020	14.95	9.70	890	578	0.04	7.06	-99
GMW-14	01/28/2016	17.61	10.25	1113	725	1.64	6.88	-4
GMW-14	04/12/2016	16.01	8.40	1076	699	0.63	6.90	22
GMW-14	07/14/2016	14.99	10.92	1089	707	0.5	7.58	58
GMW-14	07/25/2017	15.34						
GMW-14	11/30/2017	16.02						
GMW-14	07/10/2018	13.11						
GMW-14	12/06/2018	10.17	11.11	964	627	0.60	7.54	4.5
GMW-14	10/03/2019	11.79	10.90	1194	776	1.77	6.68	-33
GMW-14	12/12/2019	12.76	10.88	323	206	19.15	9.35	108
GMW-14	02/10/2020	13.78	9.17	423	269	25.21	10.60	64
GMW-14	05/11/2020	13.99	9.40	537	349	17.80	9.27	212
GMW-15	12/02/2015	39.94	9.02	888	---	3.74	7.81	-117.7
GMW-15	01/28/2016	39.25	9.29	740	481	0.65	7.44	-108
GMW-15	04/12/2016	37.89	9.90	784	509	0.48	7.66	-56
GMW-15	05/05/2016	37.28	9.87	807	525	0.33	7.24	72
GMW-15	12/28/2016	36.27	9.58	808	525	0.54	7.4	22.9
GMW-15	07/24/2017	35.57	9.78	848	551	4.08	7.44	118
GMW-15	11/30/2017	36.87	9.67	836	543	0.74	7.19	-25
GMW-15	04/05/2018	37.28	9.95	782	508	1.50	5.75	-74
GMW-15	12/05/2018	29.53	10.15	844	547	8.25	7.03	-38.3
GMW-15	05/02/2019	32.00	10.95	840	546	0.98	7.18	-43
GMW-15	10/03/2019	32.49	9.91	881	573	1.50	7.13	-27
GMW-15	12/12/2019	32.86	10.37	882	564	0.51	7.02	14
GMW-15	02/10/2020	33.82	10.54	888	567	2.29	7.10	48
GMW-15	05/11/2020	34.16	12.60	860	559	0.30	7.25	-61
GMW-16	01/28/2016	38.21	9.35	823	536	0.78	7.39	-94
GMW-16	04/12/2016	36.81	9.73	847	550	1.06	7.54	-34
GMW-16	12/28/2016	35.23	9.27	840	546	0.85	7.36	4.9
GMW-16	07/24/2017	34.56	9.75	833	541	2.0	8.07	-110
GMW-16	11/30/2017	35.83	9.64	844	548	0.87	7.10	-3.8
GMW-16	12/05/2018	28.56	10.31	1004	652	0.49	6.99	-48.1
GMW-16	12/10/2019	32.21	10.28	938	598	0.41	7.26	-152
GMW-17	01/28/2016	42.57	9.32	918	598	1.1	7.31	-57
GMW-17	04/12/2016	41.25	9.69	1002	651	0.47	7.39	45
GMW-17	12/28/2016	39.55	9.09	926	603	1.25	7.37	81.3
GMW-17	07/24/2017	38.86	9.70	1007	655	10.55	7.37	125
GMW-17	11/30/2017	40.16	9.62	1081	703	3.03	7.11	115
GMW-17	12/05/2018	32.76	10.47	842	547	0.67	6.85	112
GMW-17	12/10/2019	34.42	10.66	1000	638	8.14	7.11	150

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
GMW-18R	01/28/2016	45.61	9.31	822	535	5.77	7.67	-36
GMW-18R	04/12/2016	43.69	9.62	850	553	2.05	7.33	89
GMW-18R	12/28/2016	42.00	9.4	886	576	2.87	7.2	81.4
GMW-18R	07/24/2017	41.34	9.83	938	609	1.45	7.26	124
GMW-18R	11/30/2017	42.63	9.60	885	575	2.81	7.21	116
GMW-18R	12/05/2018	35.27	10.65	855	555	1.94	7.18	60.7
GMW-18R	12/10/2019	38.96	10.23	850	538	2.28	7.07	87
GMW-19	12/02/2015	42.48	9.12	871	---	2.61	7.41	-16.6
GMW-19	01/28/2016	41.82	9.24	857	552	2.88	7.11	115
GMW-19	02/11/2016	41.77	8.69	854	550	2.07	7.31	-35
GMW-19	04/12/2016	40.58	9.41	871	566	1.01	7.14	66
GMW-19	05/05/2016	40.04	10.06	868	564	0.52	7.48	0.5
GMW-19	07/14/2016	38.06	10.17	856	557	0.55	7.84	145
GMW-19	12/28/2016	38.75	9.49	833	542	0.8	7.73	135
GMW-19	07/24/2017	38.00	9.76	832	541	1.39	7.09	100
GMW-19	11/30/2017	39.37	9.60	860	559	2.00	7.04	124
GMW-19	04/05/2018	39.84	9.79	799	519	1.90	5.40	72
GMW-19	07/10/2018	37.30	9.96	809	526	1.32	7.12	100
GMW-19	12/05/2018	31.65	10.66	827	538	0.45	7.04	46.9
GMW-19	05/02/2019	34.51	10.94	821	534	2.59	7.19	-64
GMW-19	12/10/2019	35.67	10.31	855	544	0.41	7.09	19
GMW-20	12/02/2015	44.47	9.33	1208	---	4.7	7.23	15.7
GMW-20	01/28/2016	43.70	9.2	1153	750	5.41	7.03	73
GMW-20	02/11/2016	43.62	8.97	1079	701	3.68	7.55	-30
GMW-20	04/12/2016	42.41	9.73	1185	770	4.60	7.27	129
GMW-20	05/05/2016	41.98	9.62	959	624	8.2	7.28	35
GMW-20	07/14/2016	40.04	10.59	973	633	5.73	7.97	181
GMW-20	12/28/2016	40.75	9.07	964	627	4.24	7.38	-3.1
GMW-20	07/24/2017	40.01	9.84	993	645	6.46	7.23	110
GMW-20	11/30/2017	41.36	9.57	1071	696	5.05	7.10	107
GMW-20	04/05/2018	41.78	9.69	1069	694	5.50	5.68	86
GMW-20	07/10/2018	39.27	9.80	1101	715	12.95	6.82	111.9
GMW-20	12/05/2018	33.75	10.66	1063	692	1.20	7.15	156.3
GMW-20	05/02/2019	36.51	11.05	897	582	1.33	7.08	60
GMW-20	12/10/2019	37.67	10.40	1054	672	9.60	7.30	113
GMW-20	05/11/2020	38.61	11.40	988	641	2.14	7.36	179
GMW-33	12/02/2015	46.45	9.18	1071	---	1.9	8.04	-170
GMW-33	01/28/2016	45.70	9.38	950	618	0.94	7.22	-97
GMW-33	02/11/2016	45.62	8.92	910	592	1	8	-113.8
GMW-33	04/12/2016	44.41	9.58	939	610	0.55	8.03	-145
GMW-33	05/05/2016	43.92	9.59	888	577	0.36	7.4	-96
GMW-33	07/14/2016	42.01	9.89	1070	695	0.45	7.71	185
GMW-33	12/28/2016	42.61	9.46	915	594	0.48	7.56	12
GMW-33	07/24/2017	41.93	9.61	937	609	1.04	7.31	115
GMW-33	11/30/2017	43.28	9.60	1123	730	1.05	7.12	110
GMW-33	04/05/2018	43.75	9.70	1265	822	1.38	5.65	86

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
GMW-33	07/10/2018	41.13	9.82	958	623	1.13	6.87	112.5
GMW-33	12/05/2018	37.91	10.26	987	642	0.69	7.21	176.7
GMW-33	05/02/2019	38.44	11.64	1150	744	0.95	7.19	-87
GMW-33	12/10/2019	39.64	10.61	1473	934	0.40	7.16	54
GMW-33	05/11/2020	40.59	11.70	1229	798	0.52	7.38	192
GMW-34	01/28/2016	35.98	9.39	1593	1036	7.65	7.07	159
GMW-34	04/12/2016	34.62	10.01	1329	864	5.37	7.35	71
GMW-34	12/28/2016	32.78	9.04	826	537	9.45	7.36	76
GMW-34	07/24/2017	32.30	9.89	860	559	9.75	7.11	123
GMW-34	11/30/2017	33.59	10.13	914	594	9.22	7.04	107
GMW-34	04/05/2018	34.06	9.99	853	554	10.70	5.82	65
RMW-1	12/11/2019	12.59	11.26	924	590	0.37	6.88	-38
RMW-1	02/11/2020	13.24	10.40	881	562	0.71	6.90	-47
RMW-1	05/12/2020	13.31	9.50	1035	673	0.01	7.10	-74
RMW-2	12/11/2019	12.57	10.88	1001	639	0.50	6.76	-63
RMW-2	02/11/2020	13.25	10.10	1008	643	0.63	6.81	-76
RMW-2	05/12/2020	13.38	10.50	654	621	0.08	7.17	-134
RMW-3	12/12/2019	10.52	10.26	964	615	0.68	6.86	-59
RMW-3	02/11/2020	11.40	10.38	1053	672	0.58	6.86	-74
RMW-3	05/12/2020	11.52	10.70	973	632	0.06	7.07	-99
RMW-4	12/12/2019	6.94	10.36	928	592	0.66	6.71	-63
RMW-4	02/11/2020	7.69	8.67	1051	669	0.65	6.75	-84
RMW-4	05/12/2020	7.79	8.50	988	663	0.08	7.07	-119
MW1	06/29/2009	12.11	8.71	652	---	7.5	7.19	-49.5
MW1	09/17/2009	12.85	16.10	612	---	10.1	7.02	-45.8
MW1	11/06/2009	12.38	18.30	652	---	8.76	6.85	-42
MW1	05/10/2010	11.42	7.84	821	---	6	7.62	22.2
MW1	06/24/2010	11.10	8.30	905	---	8.8	6.3	74.9
MW1	10/20/2010	10.21	11.73	888	---	4.81	7.5	0.6
MW1	06/02/2011	9.6	7.70	527	---	17.25	7.75	39.9
MW1	07/24/2012	13.52	11.58	553	---	10.03	6.94	250
MW1	07/24/2013	14.38	9.90	814	---	7.1	8.12	---
MW1	8/20/2014	14.72	10.61	812	---	1.41	6.8	---
MW1	10/12/2015	14.81	10.80	1000	---	6.12	7.09	-2
MW1	01/28/2016	13.66	9.67	959	624	6.64	7.12	-35
MW1	04/12/2016	12.21	8.74	972	632	6.54	7.06	159
MW1	07/14/2016	11.77	9.24	866	563	6.1	8.2	127
MW1	12/28/2016	11.61	10.26	921	599	7.82	7.25	94.4
MW1	07/24/2017	12.12	9.30	887	576	5.73	6.98	105
MW1	11/30/2017	12.36	11.06	998	649	6.50	6.99	149
MW1	07/10/2018	10.01	9.20	927	602	14.31	6.85	88.4
MW1	12/04/2018	9.12	10.97	853	555	1.11	6.83	206
MW1	12/10/2019	10.04	10.51	774	497	1.80	6.47	65

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
MW3	02/11/2020	6.55	10.17	917	585	3.92	7.14	6
MW3	05/12/2020	6.25	9.6	901	585	1.61	7.39	108
MW5	06/29/2009	40.89	9.85	523	---	7.75	7.05	-12.7
MW5	09/17/2009	40.55	12.82	551	---	9.13	6.97	-27.1
MW5	11/06/2009	39.99	14.05	592	---	8.8	6.89	-27
MW5	05/10/2010	38.37	9.58	908	---	7.07	7.74	22.4
MW5	06/24/2010	38.05	9.85	842	---	9.82	7.02	99
MW5	10/20/2010	35.20	9.41	800	---	7.39	7.3	8.2
MW5	06/02/2011	36.61	9.68	639	---	16.63	7.51	56.6
MW5	07/24/2012	40.88	11.39	480	---	8.31	7.03	-85.3
MW5	07/24/2013	42.33	10.34	772	---	4.43	8.06	---
MW5	8/20/2014	42.87	10.48	753	---	1.67	6.95	---
MW5	10/12/2015	42.39	9.87	800	---	5.5	7.37	11.8
MW5	01/28/2016	41.73	9.38	766	499	7.41	7.05	99
MW5	02/11/2016	41.68	9.17	761	494	6.35	7.14	105.4
MW5	04/12/2016	40.54	9.55	794	516	5.64	7.11	137
MW5	07/14/2016	37.94	9.72	787	511	4.81	8.34	187
MW5	12/28/2016	38.69	9.53	743	483	7.18	7.83	186
MW5	07/24/2017	37.96	9.74	748	486	11.16	7.23	103
MW5	11/30/2017	39.30	9.66	781	508	9.50	7.03	128
MW5	04/05/2018	40.03	9.80	753	490	10.79	5.65	130
MW5	07/10/2018	37.30	9.87	816	530	12.32	6.87	113.1
MW5	12/05/2018	31.89	10.49	846	550	6.82	5.81	220
MW5	12/10/2019	35.88	10.51	837	534	7.70	7.13	115
TC-6D	12/02/2015	33.33	9.04	687	---	3.76	7.48	-104.8
TC-6D	01/28/2016	32.61	9.63	666	434	0.43	7.32	-119
TC-6D	04/12/2016	31.18	9.83	671	436	0.52	7.73	-109
TC-6D	05/05/2016	30.65	9.98	647	439	0.39	7.43	-79
TC-6D	12/28/2016	30.00	9.82	634	412	0.67	7.78	-102.4
TC-6D	07/24/2017	29.16	9.78	696	452	3.04	8.25	-84
TC-6D	11/30/2017	30.72	10.22	552	359	3.41	7.0	18.2
TC-6D	04/05/2018	31.03	10.23	678	441	3.75	5.69	-40
TC-6D	07/10/2018	28.55	9.72	790	514	1.19	7.94	-38.7
TC-6D	12/06/2018	23.76	10.49	768	498	0.43	7.71	-125
TC-6D	12/11/2019	26.74	9.26	679	432	3.60	7.37	5.6
TC-6D	05/11/2020	27.77	13.40	812	527	0.10	7.51	-224
TC-7	01/28/2016	7.01	6.18	909	591	2.01	7.05	20
TC-7	04/12/2016	5.79	6.20	769	500	1.03	6.91	175
TC-7	12/28/2016	5.66	7.01	748	486	2.45	7.22	107
TC-7	07/24/2017	6.38	14.07	617	401	1.75	7.28	98
TC-7	11/30/2017	6.49	9.62	716	466	5.45	7.02	128
TC-7	07/10/2018	4.58	15.92	910	591	2.23	7.35	75.1
TC-7	12/06/2018	4.06	8.64	942	612	0.77	7.60	-99.4
TC-7	12/11/2019	5.05	9.62	945	601	0.60	7.07	-119
TC-7	02/11/2020	5.57	8.23	1058	672	0.63	6.95	-118

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
TC-7	05/12/2020	5.63	8.50	948	616	0.07	7.28	-152
TC-10	07/14/2016	5.78	16.88	589	383	0.97	7.52	186
TC-10	07/25/2017	6.55	15.34	847	550	4.43	7.14	116
TC-10	07/10/2018	4.85	16.27	944	614	3.60	7.57	71.2
TC-10	02/11/2020	5.74	8.52	976	621	3.50	6.85	-56
TC-10	05/12/2020	5.74	8.60	958	623	1.50	7.01	-42
TC-17D	04/12/2016	30.27	9.71	168	110	0.80	8.48	-168
TC-17D	07/14/2016	28.51	9.67	226	147	0.46	8.86	-183
TC-17D	12/28/2016	29.04	9.81	202	131	0.65	8.21	44.5
TC-17D	07/24/2017	28.49	9.78	413	269	3.30	8.90	19.1
TC-17D	11/30/2017	29.68	9.99	418	271	3.38	8.40	60
TC-17D	07/10/2018	27.26	9.56	458	297	1.40	10.22	-251
TC-17D	12/06/2018	23.06	10.34	637	414	0.48	7.77	-160
TC-17D	12/12/2019	26.08	10.17	512	327	1.80	7.61	16
TC-22D	12/02/2015	35.41	8.72	958	---	2.32	8	-67.5
TC-22D	01/28/2016	34.13	9.37	888	576	0.84	7.75	-244
TC-22D	04/12/2016	32.67	9.75	1158	752	0.37	8.06	-210
TC-22D	12/28/2016	31.49	9.71	613	398	0.92	7.33	31.4
TC-22D	07/24/2017	30.99	9.80	714	464	2.45	9.58	-200
TC-22D	11/30/2017	32.15	9.93	720	467	5.19	8.40	37
TC-22D	12/06/2018	25.55	11.76	1229	798	1.76	6.76	-54.5
TC-23	01/28/2016	47.66	9.42	430	274	0.9	8.4	-270
TC-23	02/11/2016	47.59	9.29	415	270	1	8.47	-257.8
TC-23	04/12/2016	46.31	9.53	441	297	0.59	8.43	-225
TC-23	07/14/2016	44.03	9.79	286	187	0.44	8.28	159
TC-23	12/28/2016	44.59	9.19	639	415	1.05	7.44	-10.8
TC-23	07/24/2017	43.89	9.76	306	198	1.57	8.30	91.0
TC-23	11/30/2017	45.20	9.60	276	179	4.03	9.03	85
TC-23	07/10/2018	43.09	10.00	352	229	1.72	8.03	85.2
TC-23	12/04/2018	37.86	10.49	1092	711	3.87	7.27	67.9
TC-23	12/10/2019	41.57	11.08	1081	695	3.12	7.40	43

**OFF-SITE MONITORING WELLS**

GMW-21	06/29/2009	45.66	10.72	545	---	1.81	7.12	-200
GMW-21	09/17/2009	44.70	12.54	549	---	1.33	6.99	-186.5
GMW-21	11/06/2009	44.61	13.25	577	---	1.92	6.87	-173
GMW-21	05/10/2010	43.32	9.48	933	---	1.75	7.66	8.1
GMW-21	06/24/2010	43.00	9.67	898	---	4.9	7.14	69.3
GMW-21	10/20/2010	39.92	9.61	835	---	2.12	7.0	26.4
GMW-21	06/02/2011	41.26	9.96	686	---	10.65	7.25	43.6
GMW-21	07/24/2012	45.55	11.28	794	---	6.95	7.01	-275
GMW-21	07/24/2013	47.11	10.60	779	---	3.23	7.78	---
GMW-21	08/20/2014	47.68	11.85	743	---	0.69	6.46	---
GMW-21	10/12/2015	47.19	9.84	876	---	1.77	7.52	-92.5

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
GMW-21	12/03/2015	47.19	9.04	862	---	2.2	7.65	-81.5
GMW-21	01/28/2016	46.58	9.32	979	637	0.5	7.08	-5
GMW-21	02/11/2016	46.48	9.02	974	633	1	7.20	0
GMW-21	04/12/2016	45.33	9.46	931	605	0.68	7.31	40
GMW-21	05/05/2016	44.82	9.93	913	593	6.4	7.8	-13
GMW-21	07/14/2016	42.71	9.85	879	571	6.12	7.85	165
GMW-21	12/28/2016	43.40	9.37	874	568	1.7	7.56	18.8
GMW-21	04/13/2017	43.76	9.83	1015	659	6.85	7.00	152
GMW-21	07/24/2017	42.67	9.67	1070	659	4.02	7.21	144
GMW-21	11/30/2017	44.02	9.53	1034	672	2.23	7.23	78
GMW-21	04/05/2018	44.50	9.58	984	640	1.42	5.71	23
GMW-21	12/05/2018	36.51	10.75	899	584	0.70	7.36	-13.8
GMW-21	04/24/2019	39.69	11.81	738	552	0.72	---	36
GMW-21	10/03/2019	39.86	9.82	874	568	1.52	---	---
GMW-21	12/12/2019	40.35	10.63	848	541	3.03	7.07	22
GMW-21	02/10/2020	41.24	11.10	881	562	1.60	7.02	-37
GMW-21	05/11/2020	41.60	11.90	861	560	0.11	7.30	-13
GMW-21	05/12/2020	41.49	11.50	813	528	0.10	7.31	-86
GMW-22	01/28/2016	44.98	9.32	725	471	0.5	7.27	-83
GMW-22	02/11/2016	44.89	8.89	731	475	1.92	7.40	-77.5
GMW-22	04/12/2016	43.77	9.46	742	483	0.71	7.34	-65
GMW-22	12/28/2016	41.83	9.39	691	449	0.59	7.73	-52.1
GMW-22	04/13/2017	42.18	9.75	741	482	0.54	7.30	-39.2
GMW-22	07/24/2017	41.07	9.73	684	444	1.00	7.90	-62
GMW-22	11/30/2017	42.44	9.55	709	461	1.28	7.06	-34
GMW-22	04/05/2018	42.93	9.59	680	442	1.70	5.81	-53
GMW-22	12/05/2018	35.31	10.58	1212	787	2.33	7.20	55.7
GMW-22	04/24/2019	38.53	12.15	912	690	3.01	-	125
GMW-22	12/10/2019	38.37	10.38	726	463	0.63	7.16	31
GMW-25	06/29/2009	38.50	10.16	551	---	10.98	6.78	83.7
GMW-25	09/17/2009	37.51	12.47	562	---	8.74	6.72	62.9
GMW-25	11/06/2009	37.66	12.86	554	---	9	6.66	42
GMW-25	05/10/2010	36.36	9.40	868	---	9.05	8.05	30.5
GMW-25	06/24/2010	36.02	9.73	805	---	5.58	7.19	83
GMW-25	10/20/2010	32.75	10.08	836	---	7.52	6.9	29.5
GMW-25	06/02/2011	34.51	9.92	839	---	14.6	7.28	38.8
GMW-25	07/24/2012	38.41	11.12	649	---	8.73	6.95	242
GMW-25	07/24/2013	40.05	11.43	809	---	3.86	8.32	---
GMW-25	08/20/2014	40.52	11.05	923	---	2.45	6.88	---
GMW-25	10/12/2015	40.12	9.93	966	---	2.44	7.33	31
GMW-25	01/28/2016	39.73	9.33	849	552	8.85	7.31	155
GMW-25	02/11/2016	39.67	9.11	833	542	9.33	7.45	146
GMW-25	04/12/2016	38.70	9.58	953	619	0.78	7.08	144
GMW-25	05/05/2016	38.28	9.65	952	619	2.1	7.15	100
GMW-25	07/14/2016	35.97	10.47	892	580	5.2	7.78	210
GMW-25	12/28/2016	36.57	9.66	757	492	2.49	7.95	154
GMW-25	04/13/2017	36.96	10.06	1011	657	6.01	7.21	258

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
GMW-25	07/24/2017	35.83	10.14	917	597	14.52	7.47	152
GMW-25	11/30/2017	37.12	9.78	1031	670	7.60	7.19	124
GMW-25	04/05/2018	37.71	9.85	977	635	9.75	6.20	124
GMW-25	12/05/2018	28.93	10.41	973	632	0.78	7.20	194
GMW-25	04/24/2019	32.55	12.25	918	697	1.46	-	170
GMW-25	12/09/2019	33.17	10.52	1080	687	1.83	7.05	94
GMW-25	04/22/2020	34.04	11.3	1071	696	0.12	7.12	154
GMW-30	06/29/2009	31.86	10.63	454	---	9.13	6.92	138
GMW-30	09/17/2009	30.86	12.52	467	---	9.07	6.57	95.2
GMW-30	11/06/2009	31.06	12.90	475	---	8.4	6.25	52.3
GMW-30	05/10/2010	29.74	9.72	946	---	3.13	7.78	35.7
GMW-30	06/24/2010	29.42	9.53	905	---	7.77	7.16	101.8
GMW-30	10/20/2010	26.09	10.23	854	---	9.1	7.3	27.3
GMW-30	06/02/2011	27.87	9.88	731	---	11.58	7.45	50
GMW-30	07/24/2012	31.79	11.08	452	---	2.51	6.99	230
GMW-30	07/24/2013	33.41	10.89	554	---	3.99	8.24	---
GMW-30	08/20/2014	33.87	10.41	597	---	3.26	6.91	---
GMW-30	10/12/2015	33.34	9.95	722	---	2.51	7.63	-51.9
GMW-30	12/03/2015	33.37	9.02	715	---	4.95	7.75	-3
GMW-30	01/28/2016	33.00	9.6	871	566	5.01	7.38	194
GMW-30	02/11/2016	32.91	9.07	822	538	4.3	7.41	134
GMW-30	04/12/2016	31.98	9.75	900	585	3.89	7.15	127
GMW-30	05/05/2016	31.58	9.76	1006	654	3.5	7.31	95
GMW-30	07/14/2016	29.19	10.57	810	526	5.17	8.11	197
GMW-30	12/28/2016	29.78	9.85	749	487	4.55	8.13	167
GMW-30	04/13/2017	30.22	10.14	878	571	4.29	6.97	170
GMW-30	07/24/2017	29.08	9.64	860	559	7.93	7.22	161
GMW-30	11/30/2017	30.38	9.97	851	553	4.60	7.29	119
GMW-30	04/05/2018	31.02	9.93	963	626	7.90	6.00	121
GMW-30	12/05/2018	22.17	10.39	713	464	1.13	7.21	107
GMW-30	04/24/2019	25.94	12.43	872	662	4.05	-	217
GMW-30	12/09/2019	26.48	10.31	749	478	1.61	7.16	47
GMW-30	04/22/2020	27.50	13.1	799	519	1.89	7.26	141
GMW-35	08/20/2014	30.49	12.02	887	---	1.68	7.35	---
GMW-35	10/12/2015	30.2	10.38	848	---	3.07	7.48	76.4
GMW-35	01/28/2016	30.06	9.92	769	500	2.99	6.58	1.8
GMW-35	02/11/2016	29.83	9.44	744	484	4.91	7.16	153
GMW-35	04/12/2016	29.28	10.33	770	501	2.81	7.66	125
GMW-35	05/05/2016	29.09	10.23	750	487	4.74	7.11	120
GMW-35	07/14/2016	27.28	10.01	696	453	11.14	8.05	150
GMW-35	12/28/2016	28.01	10.14	718	467	9.9	7.77	164
GMW-35	04/13/2017	28.36	10.08	752	489	8.60	7.51	224
GMW-35	07/24/2017	27.45	9.68	714	464	12.88	6.89	181
GMW-35	11/30/2017	28.44	9.96	714	464	9.34	6.10	191
GMW-35	04/05/2018	28.88	10.06	672	437	10.76	6.48	134
GMW-35	07/10/2018	27.26	9.72	755	491	14.60	6.44	129
GMW-35	12/05/2018	21.61	10.55	792	515	8.50	6.16	130

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
GMW-35	04/24/2019	25.19	11.59	774	575	6.52	-	150
GMW-35	12/09/2019	25.64	9.65	812	518	7.60	7.15	44
GMW-35	04/22/2020	26.41	12.6	733	477	4.33	7.22	203
GMW-36	01/28/2016	34.81	9.65	833	542	2.58	6.26	2.05
GMW-36	02/11/2016	34.74	8.68	832	541	1.4	7.13	162
GMW-36	04/12/2016	33.89	9.70	842	548	1.3	6.83	157
GMW-36	05/05/2016	33.49	9.91	848	551	0.72	7.25	98
GMW-36	07/14/2016	31.01	9.96	796	518	6.5	7.99	156
GMW-36	12/28/2016	31.70	9.66	777	505	1.6	7.37	183
GMW-36	04/13/2017	32.14	9.92	897	583	2.04	7.22	196
GMW-36	07/24/2017	30.97	9.65	852	554	5.27	6.81	161
GMW-36	11/30/2017	32.23	9.72	892	580	2.63	6.50	153
GMW-36	04/05/2018	32.92	9.95	884	575	4.20	6.07	150
GMW-36	07/10/2018	31.00	9.73	940	611	5.51	6.38	129.7
GMW-36	12/04/2018	24.23	10.36	889	578	7.31	6.64	222
GMW-36	04/24/2019	27.98	11.54	868	646	4.07	-	204
GMW-36	12/09/2019	28.45	10.00	916	587	3.01	7.14	148
GMW-36	04/22/2020	29.42	11.5	929	604	1.42	7.18	258
GMW-37	01/28/2016	42.43	9.47	1030	674	3.72	6.22	2.33
GMW-37	02/11/2016	42.39	8.37	1130	674	2.38	7.07	153
GMW-37	04/12/2016	41.50	9.59	1044	679	0.84	6.45	171
GMW-37	05/05/2016	41.10	9.85	1044	679	0.80	7.18	92
GMW-37	07/14/2016	38.63	9.71	1006	654	2.19	7.45	177
GMW-37	12/28/2016	39.21	9.34	1026	667	4.20	7.21	188
GMW-37	04/13/2017	39.66	9.87	1078	701	2.81	7.49	182
GMW-37	07/24/2017	38.51	9.77	1020	663	8.61	7.04	159
GMW-37	11/30/2017	39.77	9.65	1065	692	4.55	6.30	154
GMW-37	04/05/2018	40.46	9.92	1071	696	5.96	6.16	154
GMW-37	07/10/2018	38.71	9.92	1186	771	7.30	6.46	87.9
GMW-37	12/04/2018	31.80	10.51	1207	784	6.16	6.25	166
GMW-37	04/24/2019	35.51	12.19	1234	933	5.57	-	173
GMW-37	12/09/2019	36.04	10.21	1373	873	5.18	6.98	127
GMW-37	04/22/2020	36.97	11.6	1338	870	3.55	6.98	171
GMW-38	02/11/2016	37.82	8.72	520	338	3.10	7.40	76.3
GMW-38	04/12/2016	36.97	9.66	699	455	0.77	6.91	141
GMW-38	12/28/2016	33.76	9.73	679	441	0.26	7.25	150
GMW-38	04/13/2017	34.20	10.41	609	396	2.60	7.23	119
GMW-38	11/30/2017	35.92	9.77	594	386	1.53	6.86	131
GMW-38	04/05/2018	36.56	10.09	625	407	2.12	6.27	111
GMW-38	12/04/2018	28.06	10.51	629	409	1.01	7.24	213
GMW-38	04/24/2019	31.84	12.12	614	462	0.99	-	175
GMW-38	12/09/2019	32.32	10.00	676	432	0.72	7.34	142
GMW-38	04/22/2020	33.28	11.9	665	433	0.29	7.37	220
GMW-39	02/11/2016	26.83	8.90	822	533	4.63	7.75	-84.2
GMW-39	04/12/2016	25.41	9.80	1203	782	1.94	6.75	159

**TABLE 4 – SUMMARY FIELD GEOCHEMICAL DATA**  
**VOGEL PAINT WASTE SITE**  
**GEOTEK #91-400**

Monitoring Well ID	Date	Water Level (ft below TOR)	Temperature (°C)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Dissolved Oxygen (mg/L)	pH	ORP (mV)
GMW-39	12/28/2016	23.31	10.27	1016	660	2.32	7.41	128
GMW-39	04/13/2017	23.86	10.41	1149	747	2.15	8.07	2
GMW-39	11/30/2017	24.60	10.24	1397	908	1.42	6.75	10
GMW-39	04/05/2018	24.99	10.10	1425	926	2.65	5.89	116
GMW-39	04/24/2019	19.63	14.36	1194	950	3.83	-	122
GMW-39	12/09/2019	20.32	10.00	1287	821	4.72	6.63	99
GMW-39	04/22/2020	21.63	13.2	775	504	4.01	7.63	289
GMW-40	02/11/2016	31.41	9.13	807	524	3.92	6.83	-28.3
GMW-40	04/12/2016	30.43	9.68	822	534	0.85	6.93	174
GMW-40	12/28/2016	27.57	10.13	833	541	5.95	7.25	215
GMW-40	04/13/2017	28.05	10.51	883	574	7.44	7.12	130
GMW-40	11/30/2017	29.26	10.03	897	583	6.90	7.00	86
GMW-40	04/05/2018	29.85	10.13	862	560	8.22	5.60	105
GMW-40	12/04/2018	20.88	10.21	1036	674	10.70	7.23	209
GMW-40	04/24/2019	24.65	12.04	950	716	9.54	-	198
GMW-40	12/09/2019	25.26	10.24	976	622	8.46	7.12	125
GMW-40	04/22/2020	26.28	12.3	905	588	9.10	7.18	404
GMW-41	04/12/2016	45.00	9.49	1106	719	1.80	6.86	114
GMW-41	12/28/2016	43.07	9.5	1060	689	1.61	8.0	167
GMW-41	04/13/2017	43.49	10.11	1129	734	7.04	7.28	86
GMW-41	11/30/2017	44.91	9.63	1204	783	5.70	6.47	140
GMW-41	04/05/2018	45.55	9.83	1223	795	5.45	5.65	118
GMW-41	12/04/2018	37.00	10.42	1340	871	4.91	6.99	205
GMW-41	04/24/2019	40.66	11.78	1297	973	4.64	-	185
GMW-41	12/09/2019	41.24	10.76	1409	908	4.92	6.91	115
GMW-41	04/22/2020	42.11	12.1	1367	888	4.09	6.93	196
GMW-42	04/12/2016	26.16	9.85	1002	651	4.91	6.79	22
GMW-42	12/28/2016	23.46	10.29	2609	1694	8.77	7.35	21.4
GMW-42	04/13/2017	23.38	10.27	1284	835	8.62	7.27	132
GMW-42	11/30/2017	25.41	10.40	1189	773	7.70	6.54	201
GMW-42	04/05/2018	26.02	10.15	1112	723	6.78	6.20	137
GMW-42	12/04/2018	17.47	10.39	1181	769	10.54	7.08	221
GMW-42	04/24/2019	21.21	11.58	1026	763	8.84	-	199
GMW-42	12/09/2019	21.61	10.25	1059	676	5.98	7.10	142
GMW-42	04/22/2020	22.60	13.2	1024	666	5.17	7.06	228
GMW-44	04/12/2016	34.03	9.52	862	560	8.33	6.92	181
GMW-44	12/28/2016	32.00	9.8	540	350	6.58	8.05	168
GMW-44	04/13/2017	32.45	10.75	960	624	7.43	6.98	143
GMW-44	11/30/2017	34.21	9.80	871	566	8.45	7.03	111
GMW-44	04/05/2018	34.79	9.86	866	563	9.82	5.72	119
GMW-44	12/04/2018	25.89	9.96	917	595	9.44	7.20	227
GMW-44	04/24/2019	29.60	12.12	894	673	8.62	-	207
GMW-44	12/09/2019	30.22	10.65	918	585	7.98	7.08	122
GMW-44	04/22/2020	31.23	12.5	875	569	6.96	7.16	375

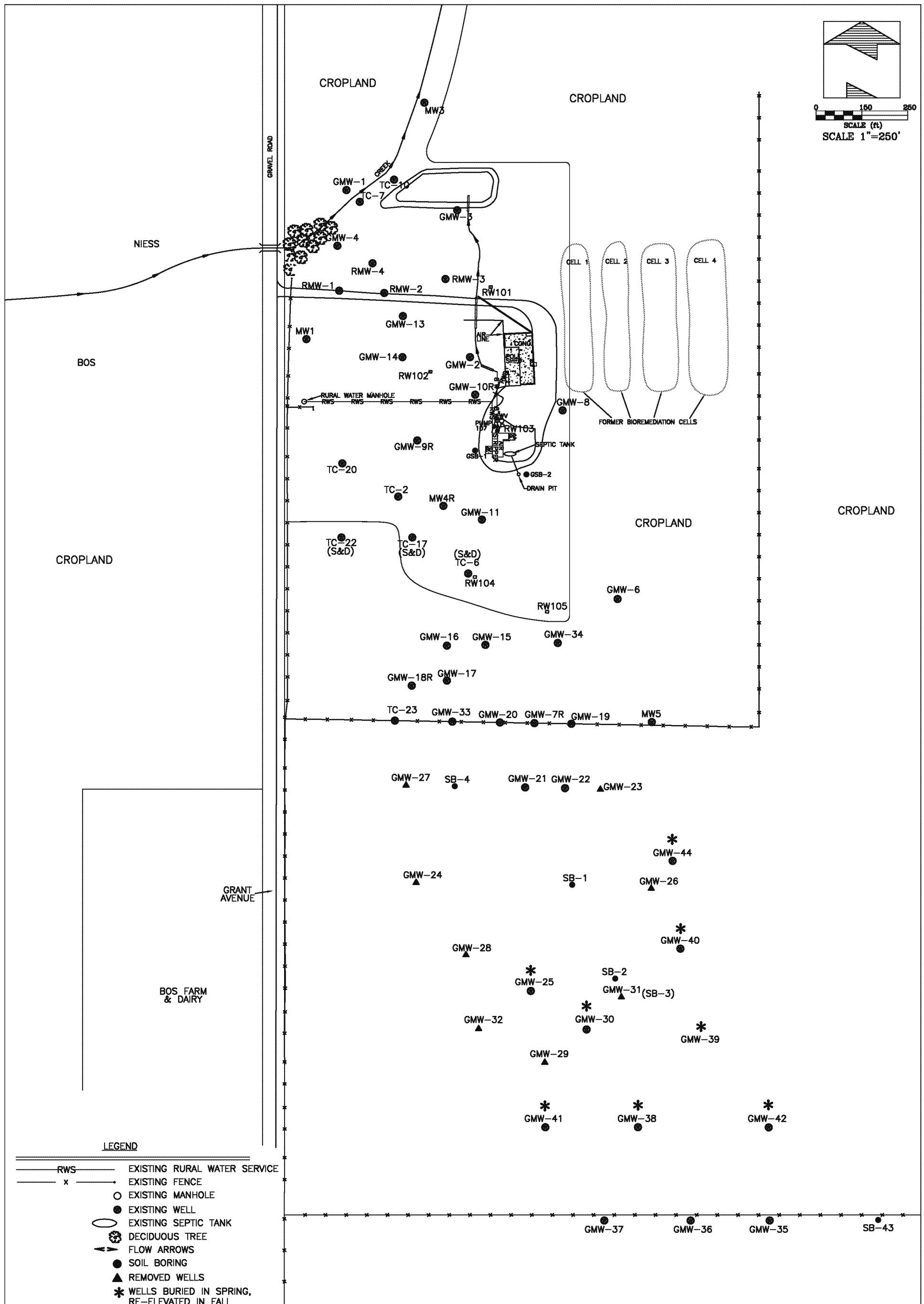
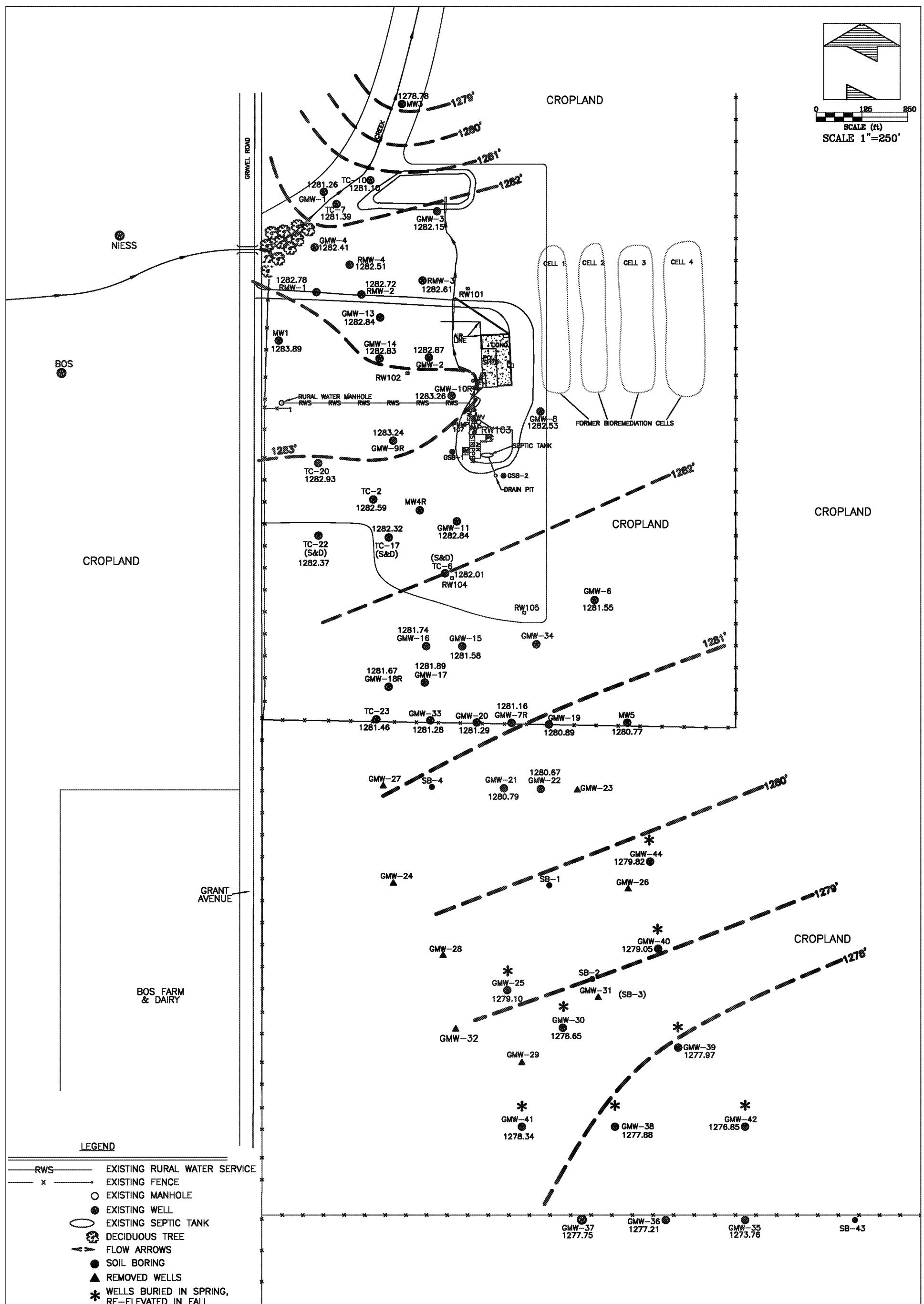


FIGURE 1  
SITE MAP  
VOGEL PAINT WASTE SITE  
MAURICE, IOWA



**FIGURE 2**  
**GROUNDWATER CONTOUR MAP**  
**BASED ON 4-18-2020 WATER LEVELS**  
**VOGEL PAINT WASTE SITE**  
**MAURICE, IOWA**

ORIGINAL DRAWING FURNISHED  
BY DGR & ASSOCIATES CO.

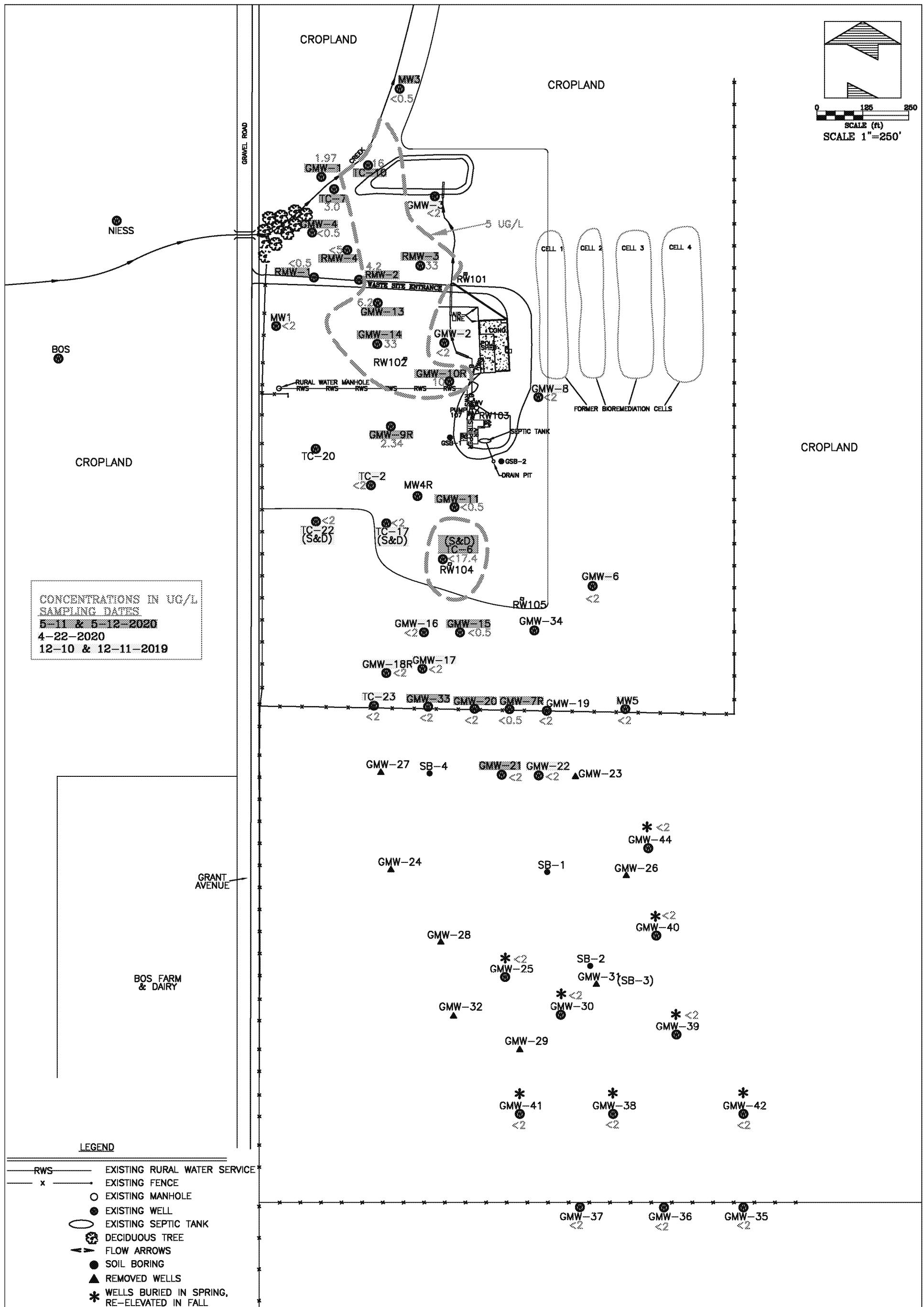
PROJECT #: 91-400

DRAWN BY: JLS

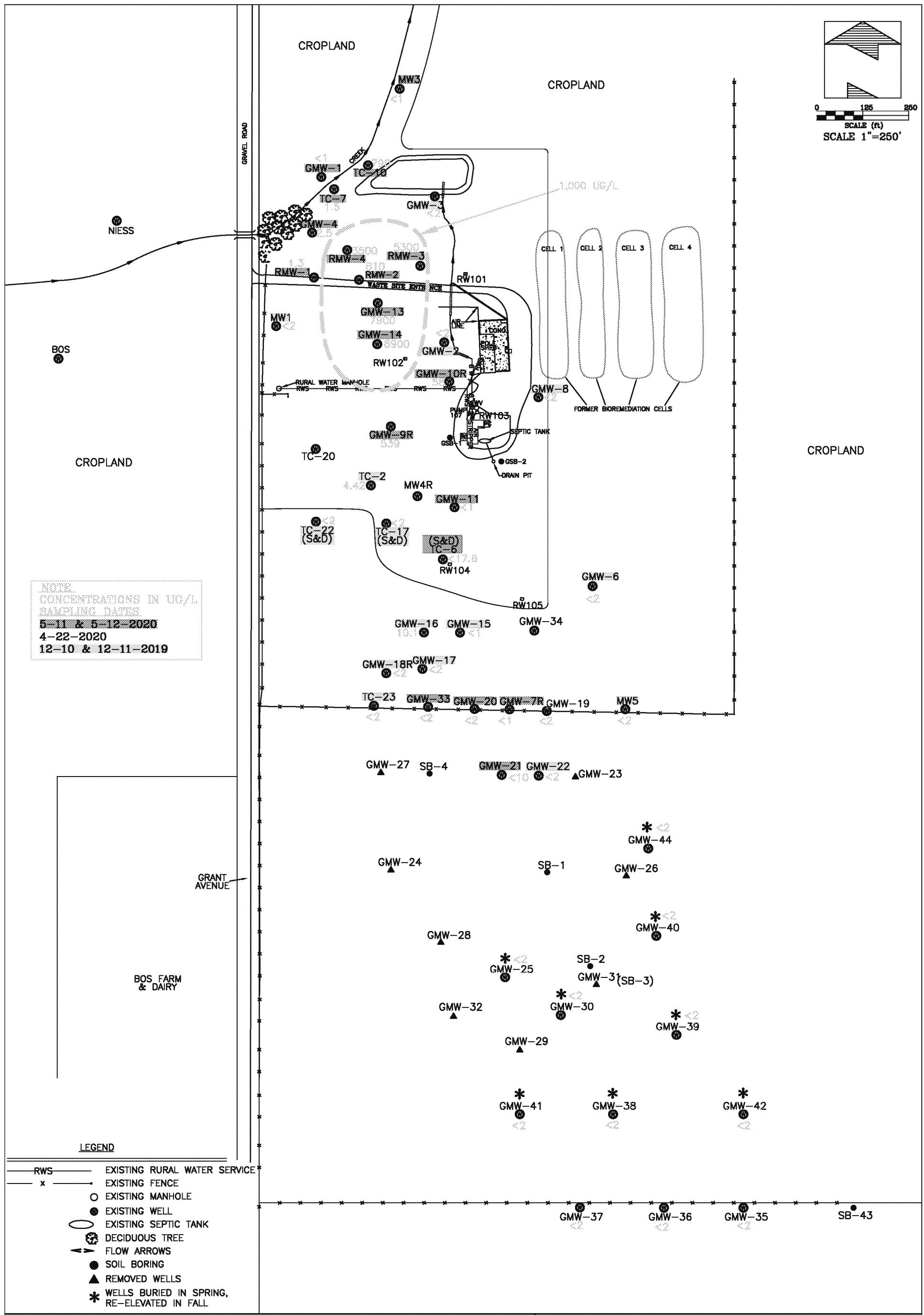
CHECKED BY:

ACAD\GEOTEK\KEITH\91-400

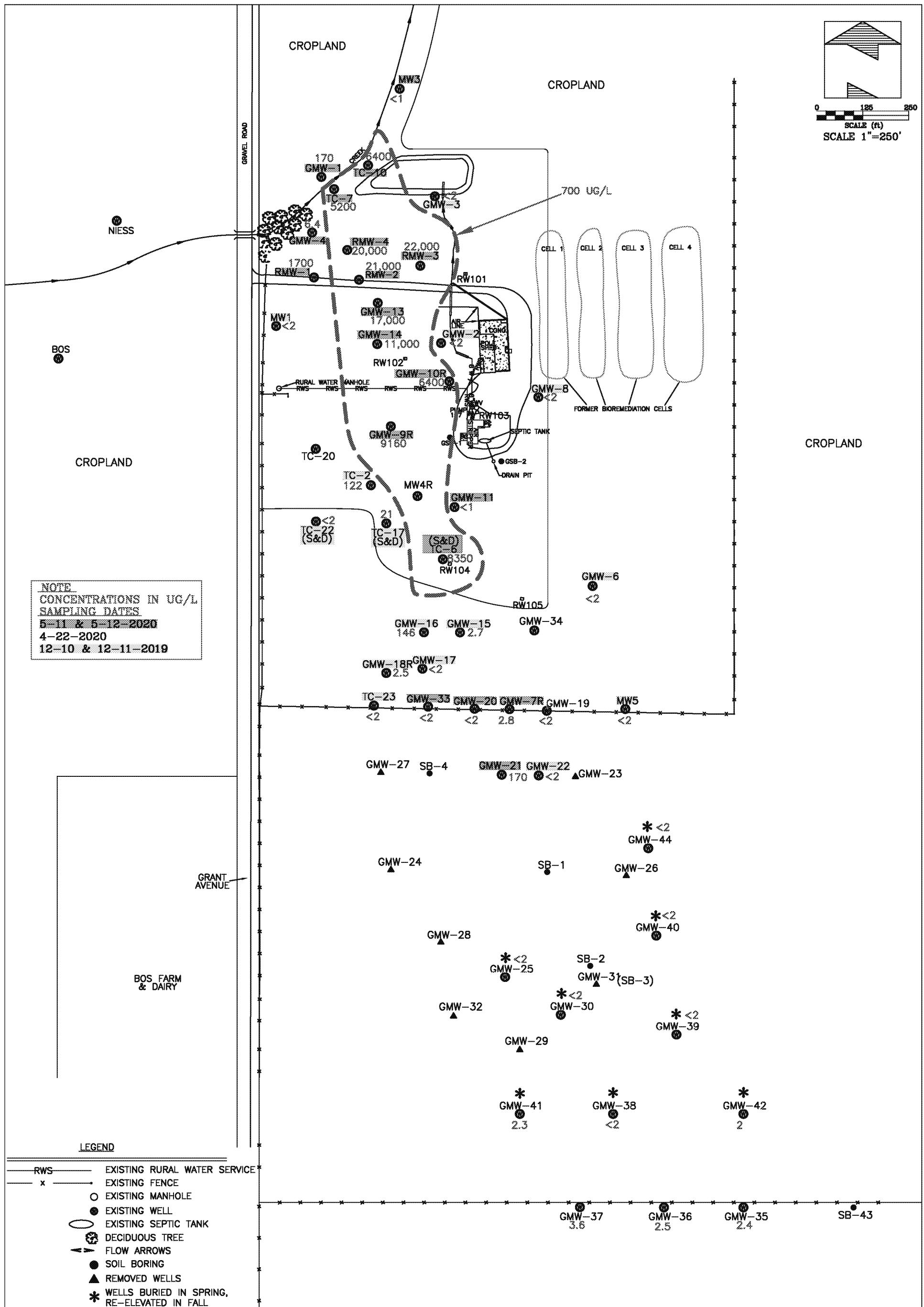
GEOTEK ENGINEERING &  
TESTING SERVICES, INC.



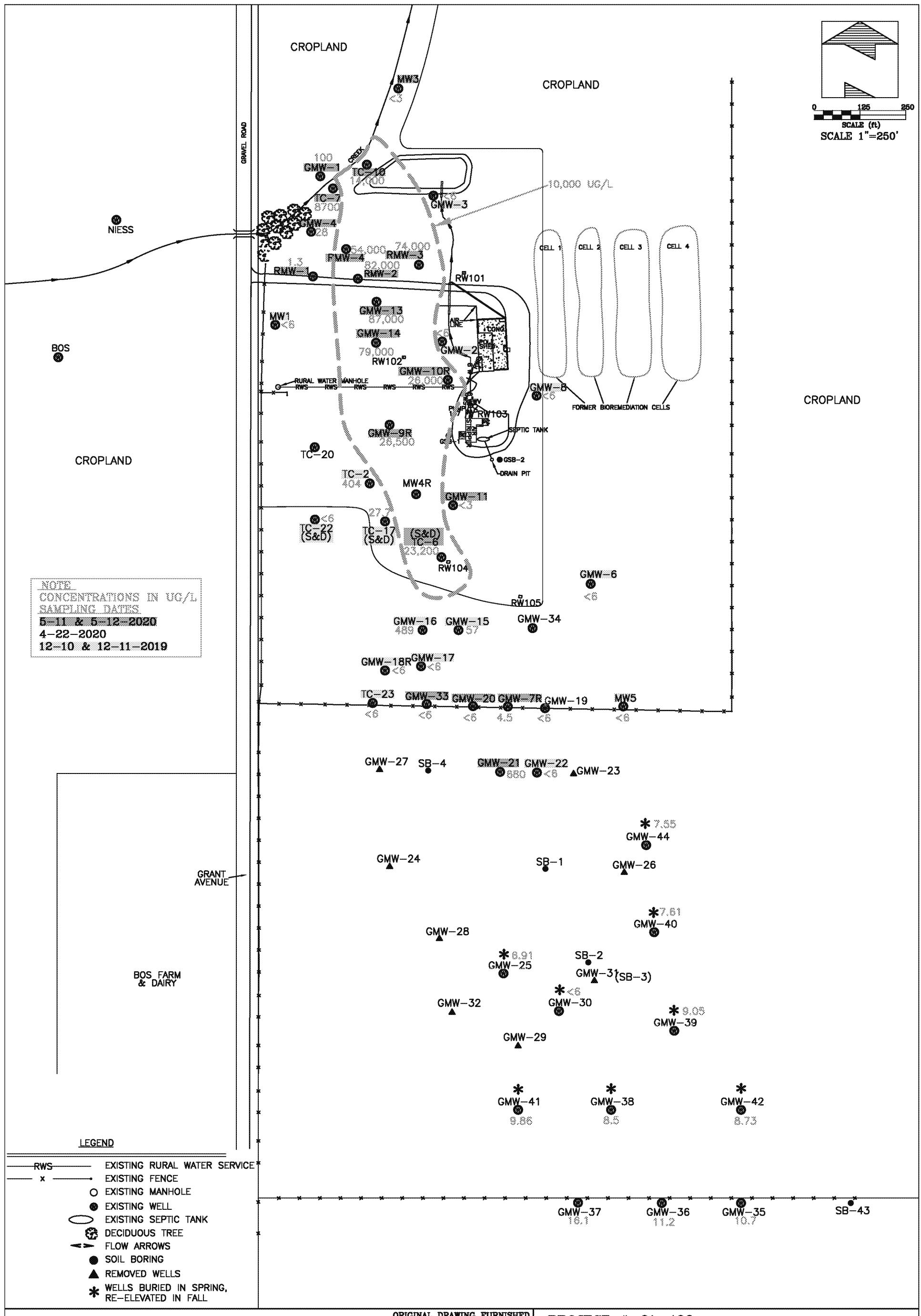
**FIGURE 3**  
**BENZENE PLUME MAP**  
**VOGEL PAINT WASTE SITE**  
**MAURICE, IOWA**



**FIGURE 4**  
**TOLUENE PLUME MAP**  
**VOGEL PAINT WASTE SITE**  
**MAURICE, IOWA**



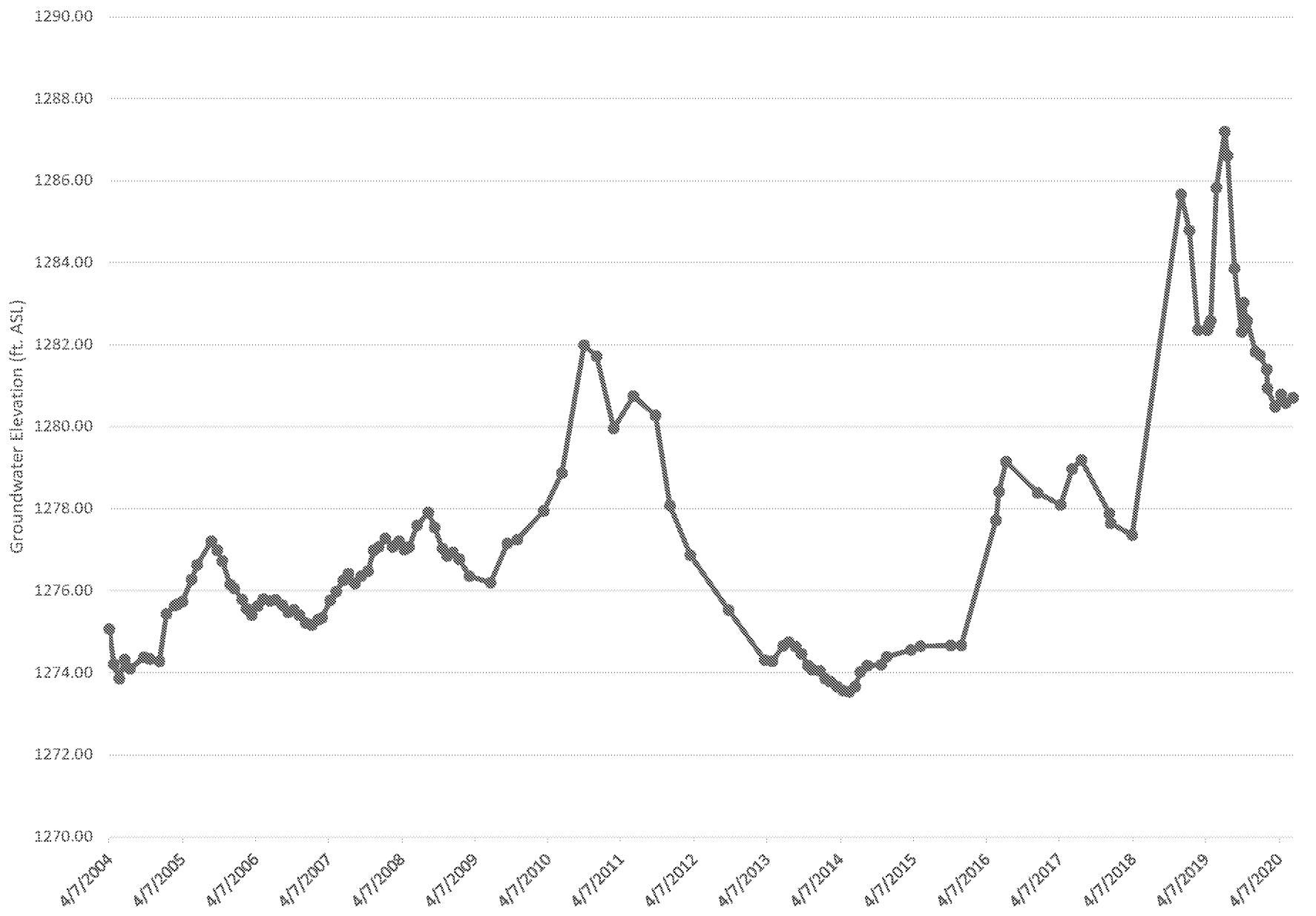
**FIGURE 5**  
**ETHYLBENZENE PLUME MAP**  
**VOGEL PAINT WASTE SITE**  
**MAURICE, IOWA**



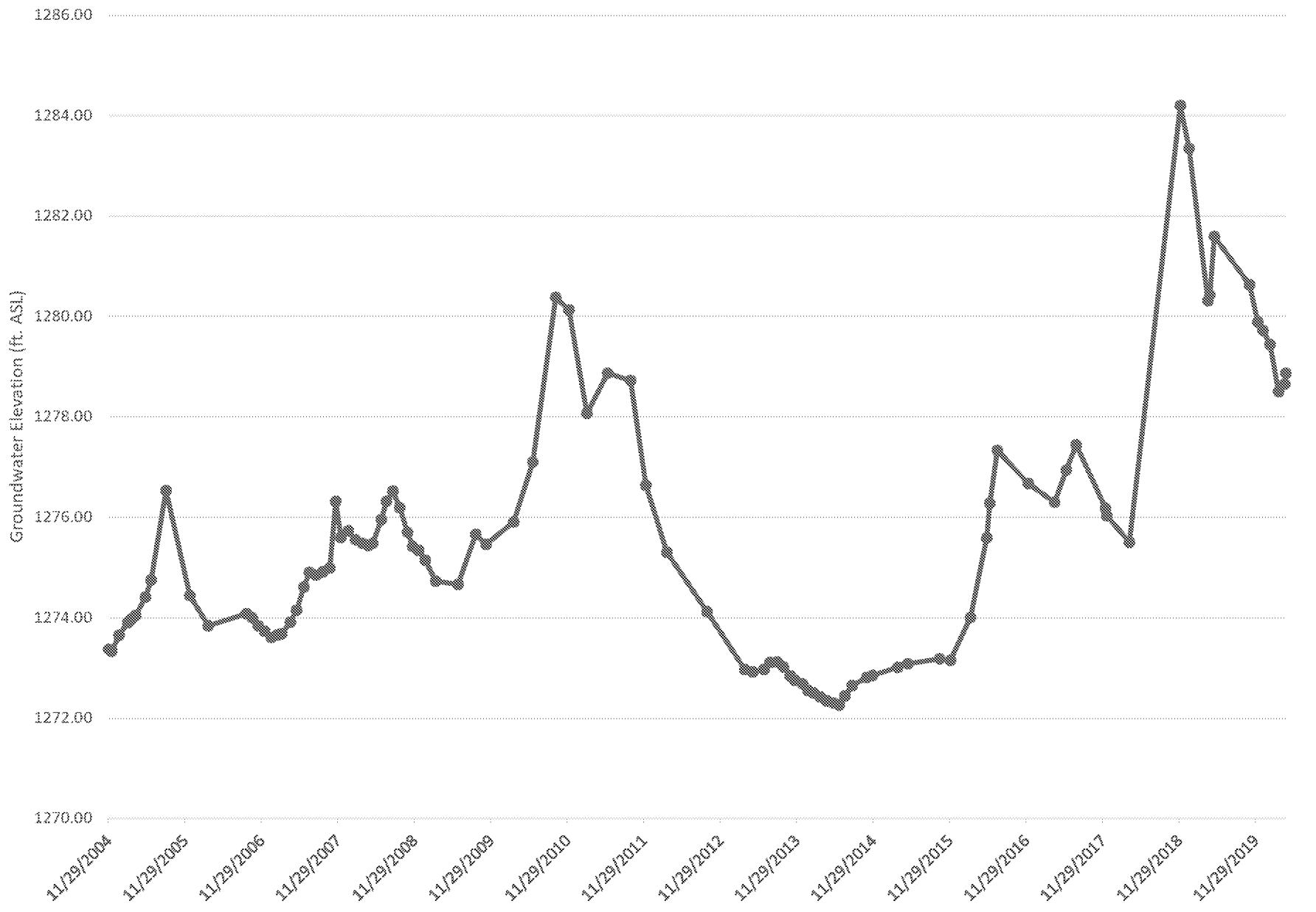
**FIGURE 6**  
**XYLENE PLUME MAP**  
**VOGEL PAINT WASTE SITE**  
**MAURICE, IOWA**

## **APPENDIX A**

### GMW-21 (April 2004 - June 2020)



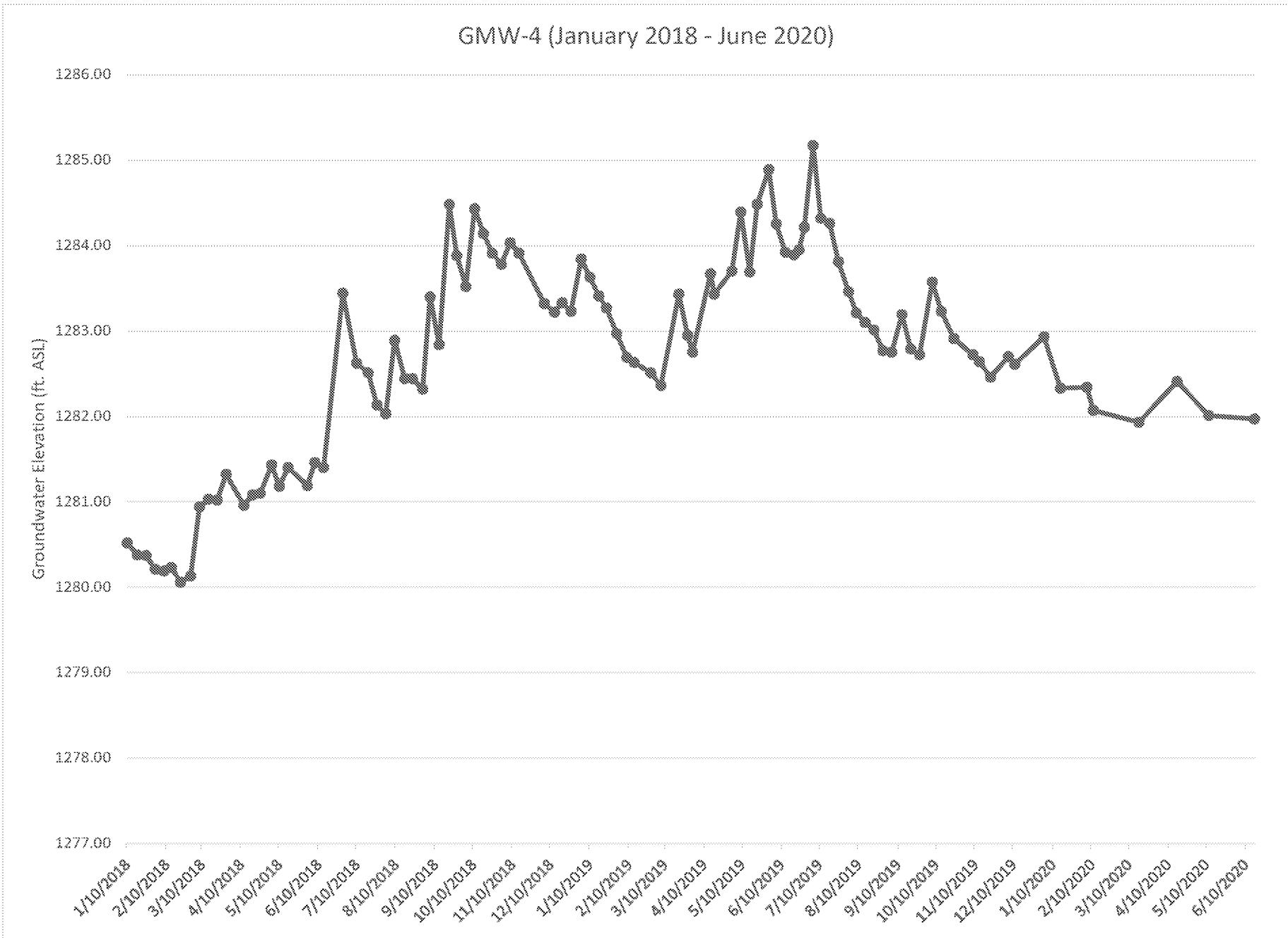
### GMW-30 (November 2004 - April 2020)

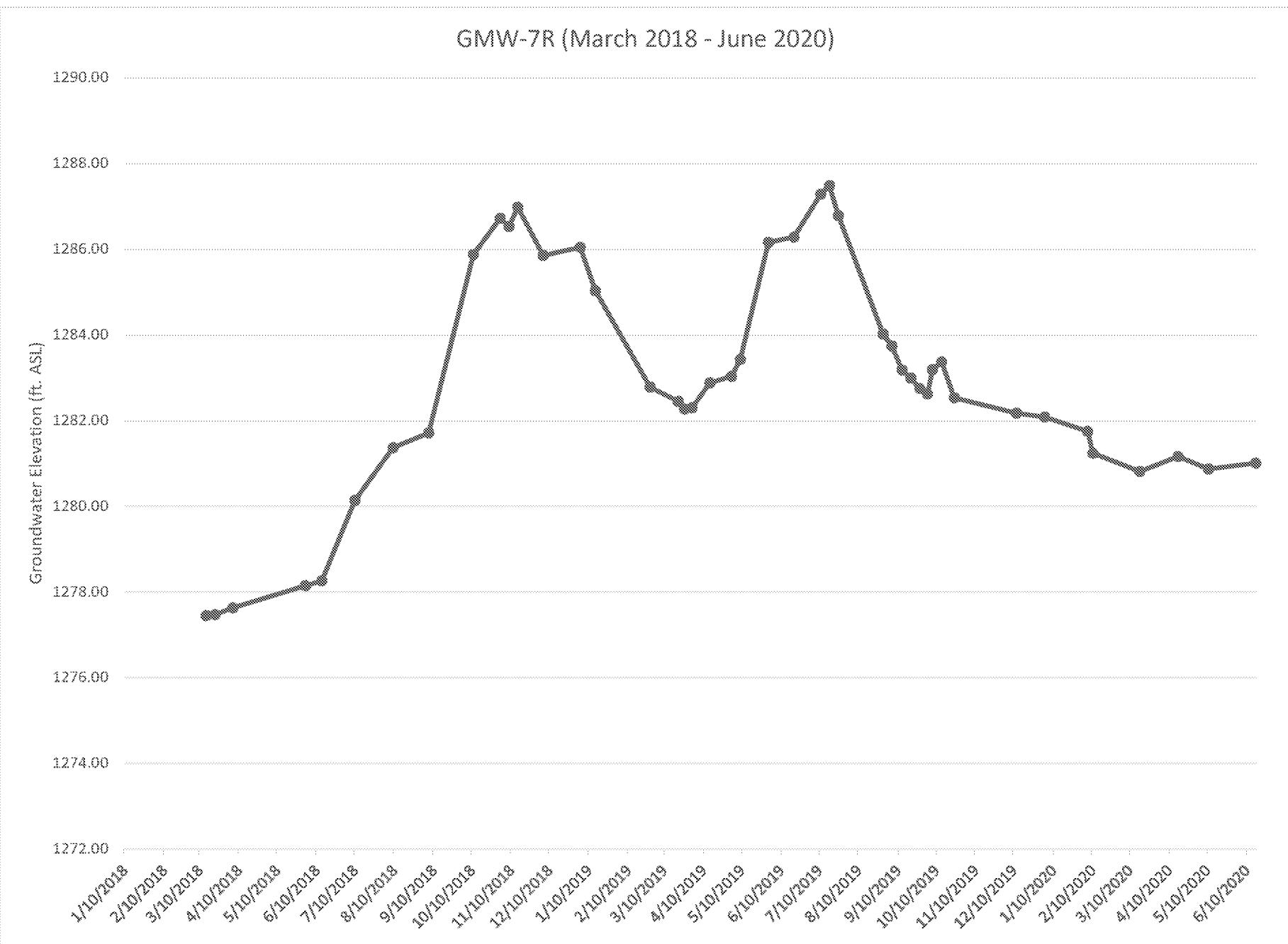


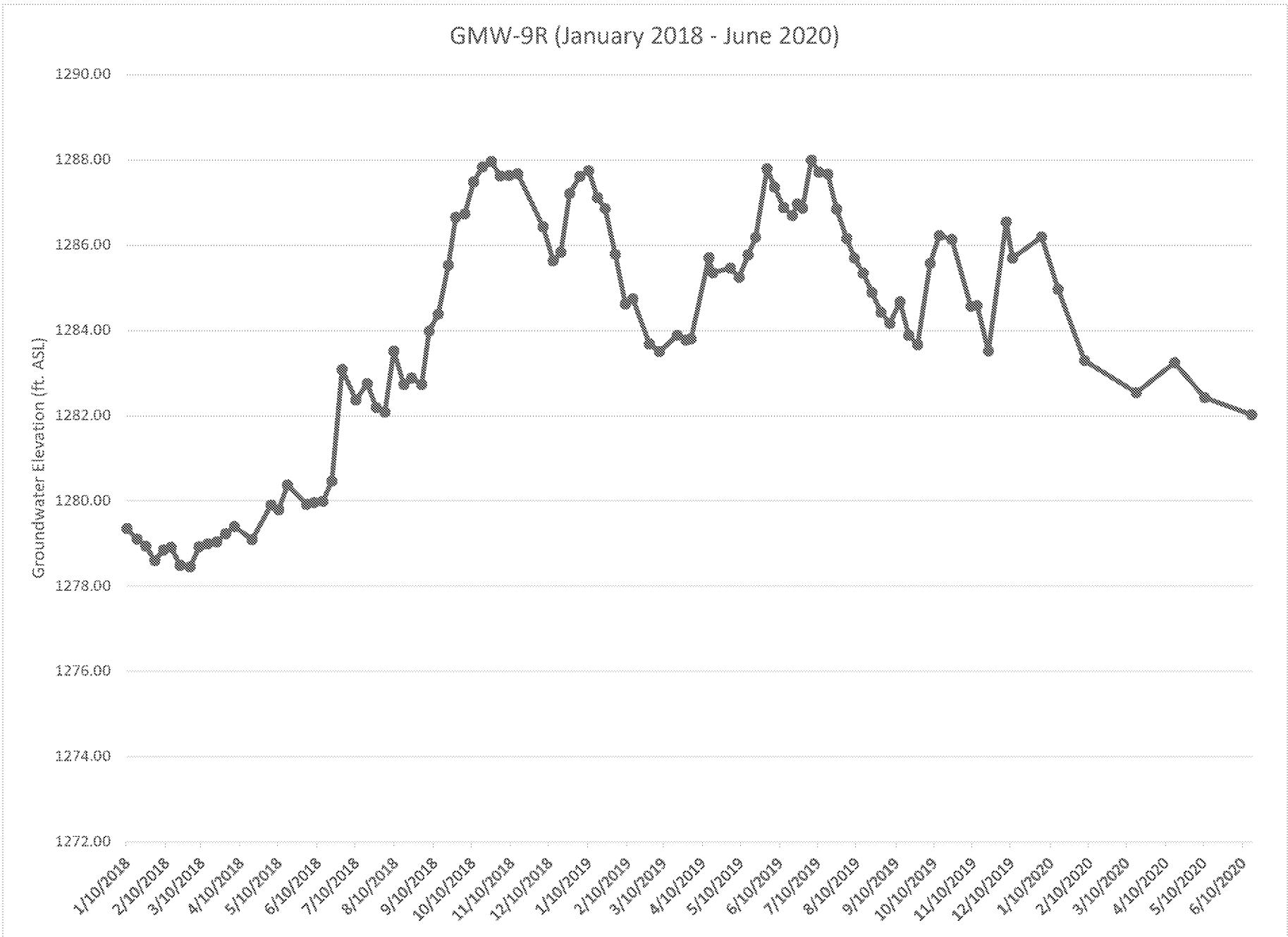
### TC-6D (October 1992 - June 2020)



ED\_004945A\_00012393-00044

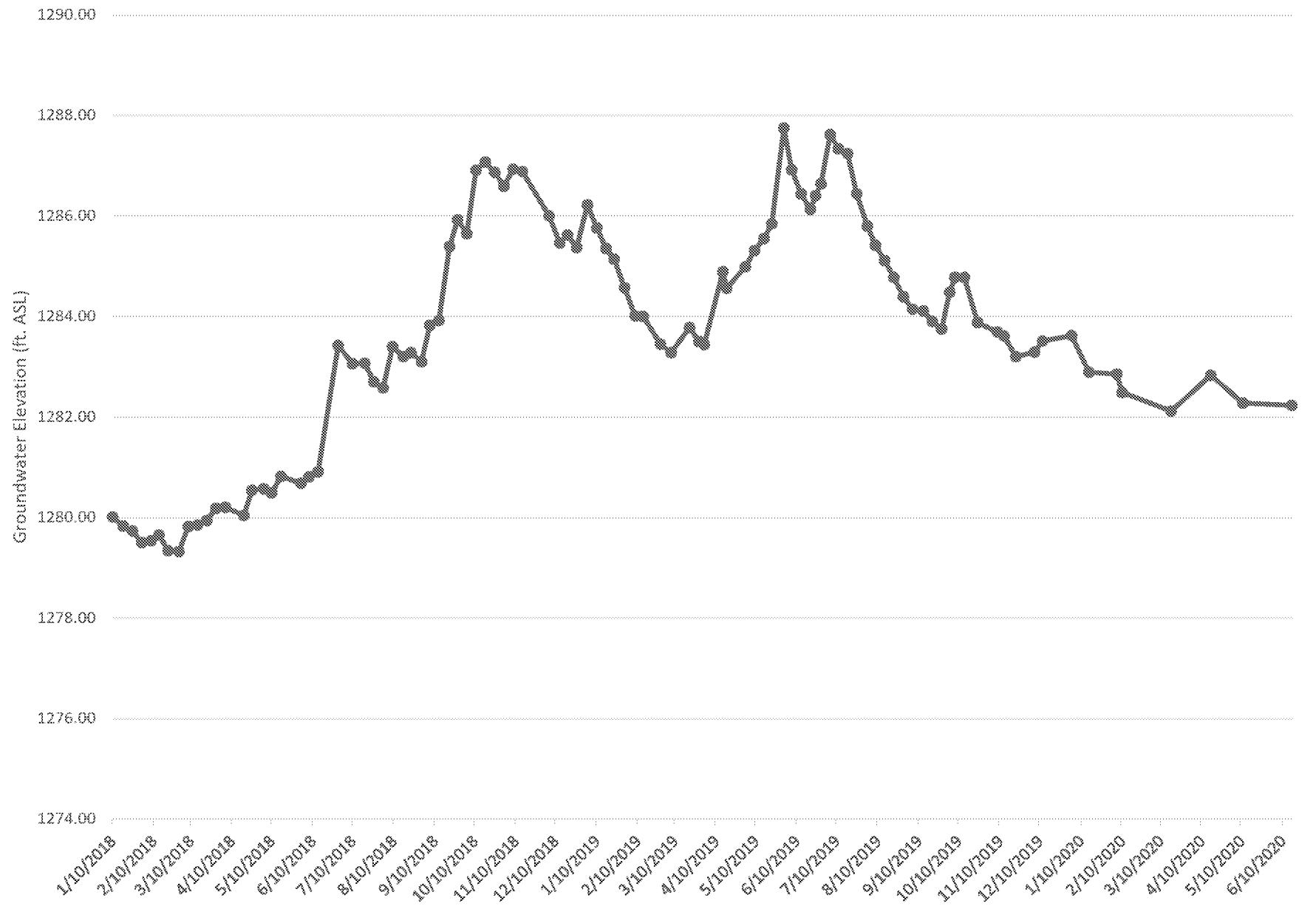




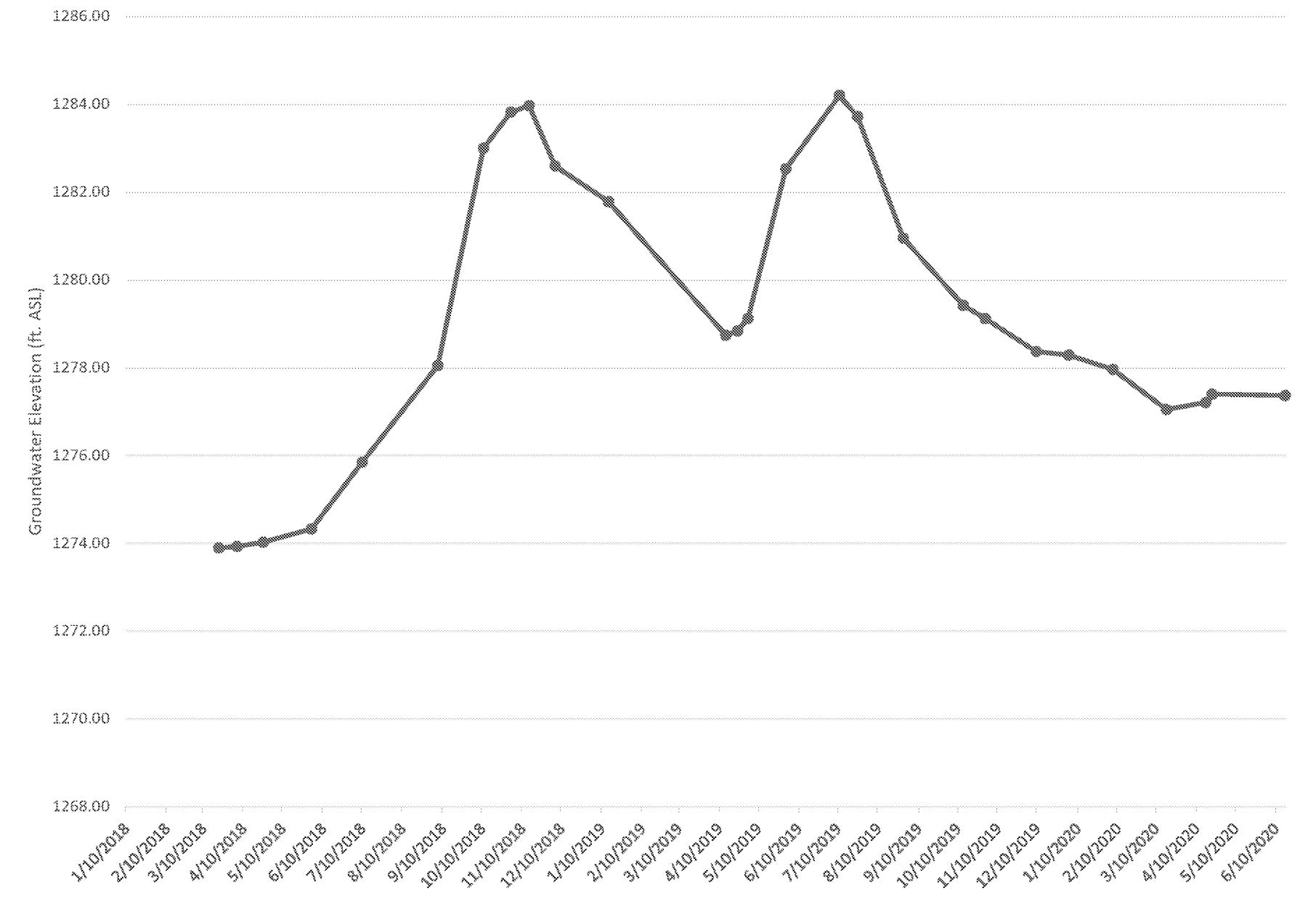


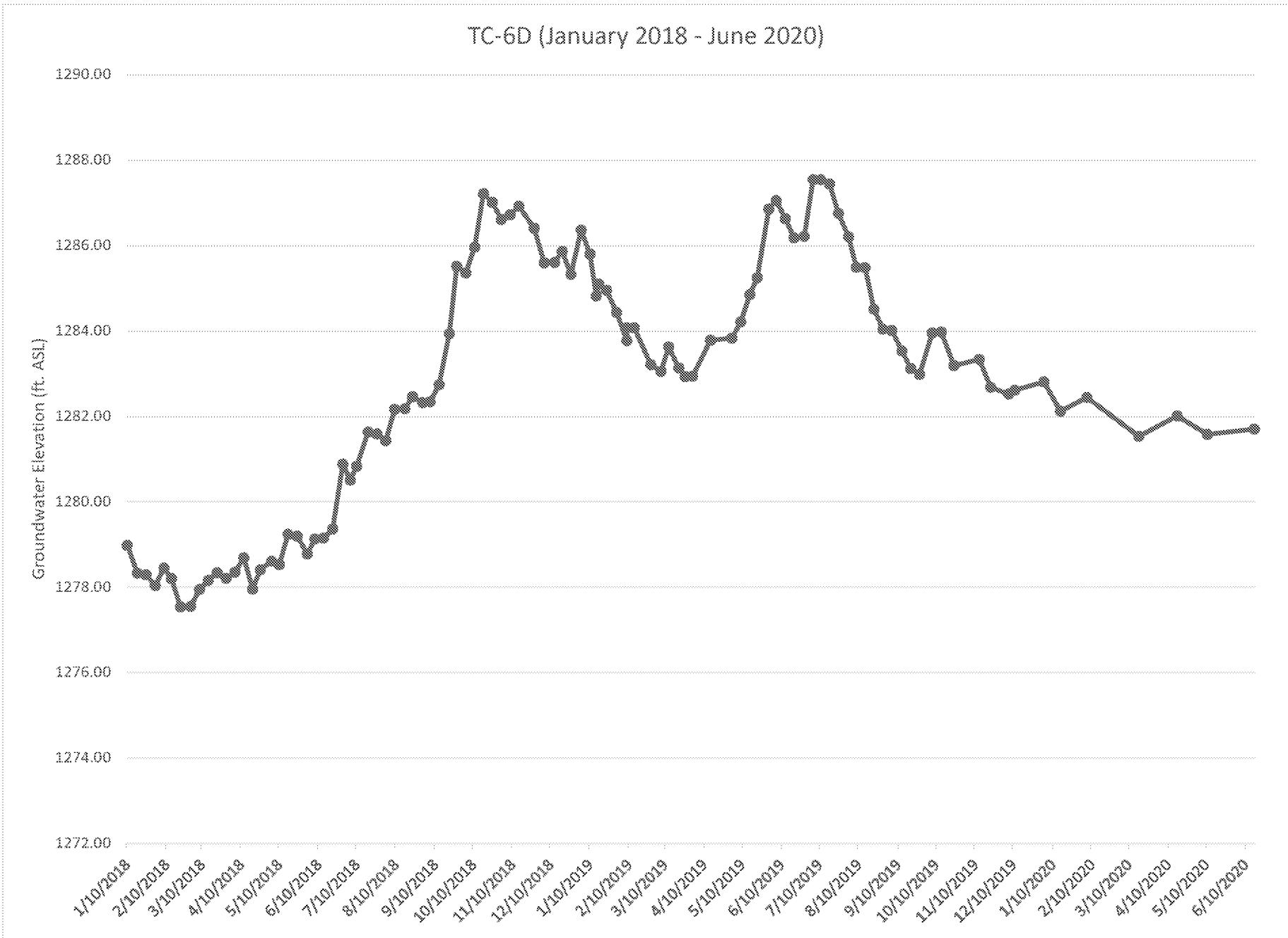


### GMW-14 (January 2018 - June 2020)



### GMW-36 (March 2018 - June 2020)





## **APPENDIX B**



Environment Testing  
America

## ANALYTICAL REPORT

Eurofins TestAmerica, Cedar Falls  
3019 Venture Way  
Cedar Falls, IA 50613  
Tel: (319)277-2401

Laboratory Job ID: 310-181662-1  
Laboratory Sample Delivery Group: 91-400  
Client Project/Site: Vogels, IA

For:  
GeoTek Engineering & Testing Services  
909 E. 50th Street  
Sioux Falls, South Dakota 57104

Attn: Keith Delange

A handwritten signature in black ink that reads "Shawn Hayes".

Authorized for release by:  
5/20/2020 2:17:28 PM

Shawn Hayes, Senior Project Manager  
(319)229-8211  
[shawn.hayes@testamericainc.com](mailto:shawn.hayes@testamericainc.com)

### LINKS

Review your project  
results through

**Total Access**

Have a Question?

Ask—  
The  
Expert

Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	6
Definitions . . . . .	12
QC Sample Results . . . . .	13
QC Association . . . . .	15
Chronicle . . . . .	17
Certification Summary . . . . .	19
Method Summary . . . . .	20
Chain of Custody . . . . .	21
Receipt Checklists . . . . .	23

# Case Narrative

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

**Job ID: 310-181662-1**

**Laboratory: Eurofins TestAmerica, Cedar Falls**

## Narrative

**Job Narrative**  
**310-181662-1**

## Comments

No additional comments.

## Receipt

The samples were received on 5/13/2020 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.2° C.

## Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

## Sample Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-181662-1	GMW4	Ground Water	05/12/20 10:50	05/13/20 09:20	
310-181662-2	RMW1	Ground Water	05/12/20 11:15	05/13/20 09:20	
310-181662-3	TC7	Ground Water	05/12/20 11:35	05/13/20 09:20	
310-181662-4	RMW4	Ground Water	05/12/20 12:00	05/13/20 09:20	
310-181662-5	RMW3	Ground Water	05/12/20 12:25	05/13/20 09:20	
310-181662-6	RMW2	Ground Water	05/12/20 12:50	05/13/20 09:20	

Eurofins TestAmerica, Cedar Falls

# Detection Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

**Client Sample ID: GMW4**

**Lab Sample ID: 310-181662-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.000179		0.000100		mg/L	1		6020A	Dissolved

**Client Sample ID: RMW1**

**Lab Sample ID: 310-181662-2**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00241		0.00200		mg/L	1		6020A	Dissolved

**Client Sample ID: TC7**

**Lab Sample ID: 310-181662-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00853		0.00200		mg/L	1		6020A	Dissolved

**Client Sample ID: RMW4**

**Lab Sample ID: 310-181662-4**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00459		0.00200		mg/L	1		6020A	Dissolved

**Client Sample ID: RMW3**

**Lab Sample ID: 310-181662-5**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00647		0.00200		mg/L	1		6020A	Dissolved

**Client Sample ID: RMW2**

**Lab Sample ID: 310-181662-6**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00697		0.00200		mg/L	1		6020A	Dissolved

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

**Client Sample ID: GMW4**

**Lab Sample ID: 310-181662-1**

Date Collected: 05/12/20 10:50

Matrix: Ground Water

Date Received: 05/13/20 09:20

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		05/18/20 07:55	05/19/20 17:22	1
Cadmium	0.000179		0.000100		mg/L		05/18/20 07:55	05/19/20 17:22	1
Chromium	<0.00500		0.00500		mg/L		05/18/20 07:55	05/19/20 17:22	1
Lead	<0.000500		0.000500		mg/L		05/18/20 07:55	05/19/20 17:22	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:54	05/19/20 15:46	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

**Client Sample ID: RMW1**

**Lab Sample ID: 310-181662-2**

Date Collected: 05/12/20 11:15

Matrix: Ground Water

Date Received: 05/13/20 09:20

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00241		0.00200		mg/L		05/18/20 07:55	05/19/20 17:41	1
Cadmium	<0.000100		0.000100		mg/L		05/18/20 07:55	05/19/20 17:41	1
Chromium	<0.00500		0.00500		mg/L		05/18/20 07:55	05/19/20 17:41	1
Lead	<0.000500		0.000500		mg/L		05/18/20 07:55	05/19/20 17:41	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:54	05/19/20 15:48	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

**Client Sample ID: TC7**

**Lab Sample ID: 310-181662-3**

Date Collected: 05/12/20 11:35

Matrix: Ground Water

Date Received: 05/13/20 09:20

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00853		0.00200		mg/L		05/18/20 07:55	05/19/20 17:44	1
Cadmium	<0.000100		0.000100		mg/L		05/18/20 07:55	05/19/20 17:44	1
Chromium	<0.00500		0.00500		mg/L		05/18/20 07:55	05/19/20 17:44	1
Lead	<0.000500		0.000500		mg/L		05/18/20 07:55	05/19/20 17:44	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:54	05/19/20 15:54	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

**Client Sample ID: RMW4**

**Lab Sample ID: 310-181662-4**

Date Collected: 05/12/20 12:00

Matrix: Ground Water

Date Received: 05/13/20 09:20

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00459		0.00200		mg/L		05/18/20 07:55	05/19/20 17:46	1
Cadmium	<0.000100		0.000100		mg/L		05/18/20 07:55	05/19/20 17:46	1
Chromium	<0.00500		0.00500		mg/L		05/18/20 07:55	05/19/20 17:46	1
Lead	<0.000500		0.000500		mg/L		05/18/20 07:55	05/19/20 17:46	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:54	05/19/20 16:01	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

**Client Sample ID: RMW3**

**Lab Sample ID: 310-181662-5**

Date Collected: 05/12/20 12:25

Matrix: Ground Water

Date Received: 05/13/20 09:20

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00647		0.00200		mg/L		05/18/20 07:55	05/19/20 17:49	1
Cadmium	<0.000100		0.000100		mg/L		05/18/20 07:55	05/19/20 17:49	1
Chromium	<0.00500		0.00500		mg/L		05/18/20 07:55	05/19/20 17:49	1
Lead	<0.000500		0.000500		mg/L		05/18/20 07:55	05/19/20 17:49	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:54	05/19/20 16:03	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

**Client Sample ID: RMW2**

**Lab Sample ID: 310-181662-6**

Date Collected: 05/12/20 12:50

Matrix: Ground Water

Date Received: 05/13/20 09:20

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00697		0.00200		mg/L		05/18/20 07:55	05/19/20 17:51	1
Cadmium	<0.000100		0.000100		mg/L		05/18/20 07:55	05/19/20 17:51	1
Chromium	<0.00500		0.00500		mg/L		05/18/20 07:55	05/19/20 17:51	1
Lead	<0.000500		0.000500		mg/L		05/18/20 07:55	05/19/20 17:51	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:54	05/19/20 16:05	1

# Definitions/Glossary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
D	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# QC Sample Results

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogels, IA

Job ID: 310-181662-1  
 SDG: 91-400

## Method: 6020A - Metals (ICP/MS)

**Lab Sample ID:** MB 310-279038/1-B

**Matrix:** Water

**Analysis Batch:** 279476

**Client Sample ID:** Method Blank

**Prep Type:** Dissolved

**Prep Batch:** 279122

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		05/18/20 07:55	05/19/20 17:17	1
Cadmium	<0.000100		0.000100		mg/L		05/18/20 07:55	05/19/20 17:17	1
Chromium	<0.00500		0.00500		mg/L		05/18/20 07:55	05/19/20 17:17	1
Lead	<0.000500		0.000500		mg/L		05/18/20 07:55	05/19/20 17:17	1

**Lab Sample ID:** LCS 310-279038/2-B

**Matrix:** Water

**Analysis Batch:** 279476

**Client Sample ID:** Lab Control Sample

**Prep Type:** Dissolved

**Prep Batch:** 279122

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.0800	0.07233		mg/L		90	80 - 120
Cadmium	0.0400	0.03881		mg/L		97	80 - 120
Chromium	0.0800	0.07793		mg/L		97	80 - 120
Lead	0.0400	0.04017		mg/L		100	80 - 120

**Lab Sample ID:** 310-181662-1 MS

**Matrix:** Ground Water

**Analysis Batch:** 279476

**Client Sample ID:** GMW4

**Prep Type:** Dissolved

**Prep Batch:** 279122

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	<0.00200		0.0800	0.07173		mg/L		90	75 - 125
Cadmium	0.000179		0.0400	0.03929		mg/L		98	75 - 125
Chromium	<0.00500		0.0800	0.07831		mg/L		98	75 - 125
Lead	<0.000500		0.0400	0.03935		mg/L		98	75 - 125

**Lab Sample ID:** 310-181662-1 MSD

**Matrix:** Ground Water

**Analysis Batch:** 279476

**Client Sample ID:** GMW4

**Prep Type:** Dissolved

**Prep Batch:** 279122

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	<0.00200		0.0800	0.07072		mg/L		88	75 - 125	1	20
Cadmium	0.000179		0.0400	0.03867		mg/L		96	75 - 125	2	20
Chromium	<0.00500		0.0800	0.07649		mg/L		96	75 - 125	2	20
Lead	<0.000500		0.0400	0.03846		mg/L		96	75 - 125	2	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID:** MB 310-279039/1-B

**Matrix:** Water

**Analysis Batch:** 279423

**Client Sample ID:** Method Blank

**Prep Type:** Dissolved

**Prep Batch:** 279240

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:54	05/19/20 15:41	1

**Lab Sample ID:** LCS 310-279039/2-B

**Matrix:** Water

**Analysis Batch:** 279423

**Client Sample ID:** Lab Control Sample

**Prep Type:** Dissolved

**Prep Batch:** 279240

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00167	0.001687		mg/L		101	80 - 120

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

## Method: 7470A - Mercury (CVAA)

Lab Sample ID: 310-181662-2 MS

Matrix: Ground Water

Analysis Batch: 279423

Client Sample ID: RMW1

Prep Type: Dissolved

Prep Batch: 279240

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	Limits
Mercury	<0.000200		0.00167	0.001521		mg/L	91	80 - 120	

Lab Sample ID: 310-181662-2 MSD

Matrix: Ground Water

Analysis Batch: 279423

Client Sample ID: RMW1

Prep Type: Dissolved

Prep Batch: 279240

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec.	Limits	RPD	Limit
Mercury	<0.000200		0.00167	0.001427		mg/L	86	80 - 120		6	20

# QC Association Summary

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogels, IA

Job ID: 310-181662-1  
 SDG: 91-400

## Metals

### Filtration Batch: 279038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181662-1	GMW4	Dissolved	Ground Water	Filtration	
310-181662-2	RMW1	Dissolved	Ground Water	Filtration	
310-181662-3	TC7	Dissolved	Ground Water	Filtration	
310-181662-4	RMW4	Dissolved	Ground Water	Filtration	
310-181662-5	RMW3	Dissolved	Ground Water	Filtration	
310-181662-6	RMW2	Dissolved	Ground Water	Filtration	
MB 310-279038/1-B	Method Blank	Dissolved	Water	Filtration	
LCS 310-279038/2-B	Lab Control Sample	Dissolved	Water	Filtration	
310-181662-1 MS	GMW4	Dissolved	Ground Water	Filtration	
310-181662-1 MSD	GMW4	Dissolved	Ground Water	Filtration	

### Filtration Batch: 279039

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181662-1	GMW4	Dissolved	Ground Water	Filtration	
310-181662-2	RMW1	Dissolved	Ground Water	Filtration	
310-181662-3	TC7	Dissolved	Ground Water	Filtration	
310-181662-4	RMW4	Dissolved	Ground Water	Filtration	
310-181662-5	RMW3	Dissolved	Ground Water	Filtration	
310-181662-6	RMW2	Dissolved	Ground Water	Filtration	
MB 310-279039/1-B	Method Blank	Dissolved	Water	Filtration	
LCS 310-279039/2-B	Lab Control Sample	Dissolved	Water	Filtration	
310-181662-2 MS	RMW1	Dissolved	Ground Water	Filtration	
310-181662-2 MSD	RMW1	Dissolved	Ground Water	Filtration	

### Prep Batch: 279122

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181662-1	GMW4	Dissolved	Ground Water	3010A	279038
310-181662-2	RMW1	Dissolved	Ground Water	3010A	279038
310-181662-3	TC7	Dissolved	Ground Water	3010A	279038
310-181662-4	RMW4	Dissolved	Ground Water	3010A	279038
310-181662-5	RMW3	Dissolved	Ground Water	3010A	279038
310-181662-6	RMW2	Dissolved	Ground Water	3010A	279038
MB 310-279038/1-B	Method Blank	Dissolved	Water	3010A	279038
LCS 310-279038/2-B	Lab Control Sample	Dissolved	Water	3010A	279038
310-181662-1 MS	GMW4	Dissolved	Ground Water	3010A	279038
310-181662-1 MSD	GMW4	Dissolved	Ground Water	3010A	279038

### Prep Batch: 279240

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181662-1	GMW4	Dissolved	Ground Water	7470A	279039
310-181662-2	RMW1	Dissolved	Ground Water	7470A	279039
310-181662-3	TC7	Dissolved	Ground Water	7470A	279039
310-181662-4	RMW4	Dissolved	Ground Water	7470A	279039
310-181662-5	RMW3	Dissolved	Ground Water	7470A	279039
310-181662-6	RMW2	Dissolved	Ground Water	7470A	279039
MB 310-279039/1-B	Method Blank	Dissolved	Water	7470A	279039
LCS 310-279039/2-B	Lab Control Sample	Dissolved	Water	7470A	279039
310-181662-2 MS	RMW1	Dissolved	Ground Water	7470A	279039
310-181662-2 MSD	RMW1	Dissolved	Ground Water	7470A	279039

# QC Association Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

## Metals

### Analysis Batch: 279423

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181662-1	GMW4	Dissolved	Ground Water	7470A	279240
310-181662-2	RMW1	Dissolved	Ground Water	7470A	279240
310-181662-3	TC7	Dissolved	Ground Water	7470A	279240
310-181662-4	RMW4	Dissolved	Ground Water	7470A	279240
310-181662-5	RMW3	Dissolved	Ground Water	7470A	279240
310-181662-6	RMW2	Dissolved	Ground Water	7470A	279240
MB 310-279039/1-B	Method Blank	Dissolved	Water	7470A	279240
LCS 310-279039/2-B	Lab Control Sample	Dissolved	Water	7470A	279240
310-181662-2 MS	RMW1	Dissolved	Ground Water	7470A	279240
310-181662-2 MSD	RMW1	Dissolved	Ground Water	7470A	279240

### Analysis Batch: 279476

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181662-1	GMW4	Dissolved	Ground Water	6020A	279122
310-181662-2	RMW1	Dissolved	Ground Water	6020A	279122
310-181662-3	TC7	Dissolved	Ground Water	6020A	279122
310-181662-4	RMW4	Dissolved	Ground Water	6020A	279122
310-181662-5	RMW3	Dissolved	Ground Water	6020A	279122
310-181662-6	RMW2	Dissolved	Ground Water	6020A	279122
MB 310-279038/1-B	Method Blank	Dissolved	Water	6020A	279122
LCS 310-279038/2-B	Lab Control Sample	Dissolved	Water	6020A	279122
310-181662-1 MS	GMW4	Dissolved	Ground Water	6020A	279122
310-181662-1 MSD	GMW4	Dissolved	Ground Water	6020A	279122

# Lab Chronicle

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogels, IA

Job ID: 310-181662-1  
 SDG: 91-400

**Client Sample ID: GMW4**

Date Collected: 05/12/20 10:50  
 Date Received: 05/13/20 09:20

**Lab Sample ID: 310-181662-1**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			279038	05/15/20 15:31	HED	TAL CF
Dissolved	Prep	3010A			279122	05/18/20 07:55	HED	TAL CF
Dissolved	Analysis	6020A		1	279476	05/19/20 17:22	SAD	TAL CF
Dissolved	Filtration	Filtration			279039	05/15/20 15:32	HED	TAL CF
Dissolved	Prep	7470A			279240	05/18/20 14:54	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 15:46	HIS	TAL CF

**Client Sample ID: RMW1**

Date Collected: 05/12/20 11:15  
 Date Received: 05/13/20 09:20

**Lab Sample ID: 310-181662-2**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			279038	05/15/20 15:31	HED	TAL CF
Dissolved	Prep	3010A			279122	05/18/20 07:55	HED	TAL CF
Dissolved	Analysis	6020A		1	279476	05/19/20 17:41	SAD	TAL CF
Dissolved	Filtration	Filtration			279039	05/15/20 15:32	HED	TAL CF
Dissolved	Prep	7470A			279240	05/18/20 14:54	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 15:48	HIS	TAL CF

**Client Sample ID: TC7**

Date Collected: 05/12/20 11:35  
 Date Received: 05/13/20 09:20

**Lab Sample ID: 310-181662-3**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			279038	05/15/20 15:31	HED	TAL CF
Dissolved	Prep	3010A			279122	05/18/20 07:55	HED	TAL CF
Dissolved	Analysis	6020A		1	279476	05/19/20 17:44	SAD	TAL CF
Dissolved	Filtration	Filtration			279039	05/15/20 15:32	HED	TAL CF
Dissolved	Prep	7470A			279240	05/18/20 14:54	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 15:54	HIS	TAL CF

**Client Sample ID: RMW4**

Date Collected: 05/12/20 12:00  
 Date Received: 05/13/20 09:20

**Lab Sample ID: 310-181662-4**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			279038	05/15/20 15:31	HED	TAL CF
Dissolved	Prep	3010A			279122	05/18/20 07:55	HED	TAL CF
Dissolved	Analysis	6020A		1	279476	05/19/20 17:46	SAD	TAL CF
Dissolved	Filtration	Filtration			279039	05/15/20 15:32	HED	TAL CF
Dissolved	Prep	7470A			279240	05/18/20 14:54	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 16:01	HIS	TAL CF

Eurofins TestAmerica, Cedar Falls

# Lab Chronicle

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

**Client Sample ID: RMW3**

Date Collected: 05/12/20 12:25  
Date Received: 05/13/20 09:20

**Lab Sample ID: 310-181662-5**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			279038	05/15/20 15:31	HED	TAL CF
Dissolved	Prep	3010A			279122	05/18/20 07:55	HED	TAL CF
Dissolved	Analysis	6020A		1	279476	05/19/20 17:49	SAD	TAL CF
Dissolved	Filtration	Filtration			279039	05/15/20 15:32	HED	TAL CF
Dissolved	Prep	7470A			279240	05/18/20 14:54	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 16:03	HIS	TAL CF

**Client Sample ID: RMW2**

Date Collected: 05/12/20 12:50  
Date Received: 05/13/20 09:20

**Lab Sample ID: 310-181662-6**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			279038	05/15/20 15:31	HED	TAL CF
Dissolved	Prep	3010A			279122	05/18/20 07:55	HED	TAL CF
Dissolved	Analysis	6020A		1	279476	05/19/20 17:51	SAD	TAL CF
Dissolved	Filtration	Filtration			279039	05/15/20 15:32	HED	TAL CF
Dissolved	Prep	7470A			279240	05/18/20 14:54	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 16:05	HIS	TAL CF

## Laboratory References:

TAL CF = Eurofins TestAmerica, Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

## Accreditation/Certification Summary

Client: GeoTek Engineering & Testing Services

Project/Site: Vogels, IA

Job ID: 310-181662-1

SDG: 91-400

### Laboratory: Eurofins TestAmerica, Cedar Falls

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	101044	11-01-20
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-20
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-20
Georgia	State	IA100001 (OR)	09-29-20
Illinois	NELAP	200024	11-29-20
Iowa	State	007	12-01-21
Kansas	NELAP	E-10341	01-31-21
Minnesota	NELAP	019-999-319	12-31-20
Minnesota (Petrofund)	State	3349	08-22-21
North Dakota	State	R-186	09-30-20
Oregon	NELAP	IA100001	09-29-20
USDA	US Federal Programs	P330-19-00003	01-02-22

Eurofins TestAmerica, Cedar Falls

## Method Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels, IA

Job ID: 310-181662-1  
SDG: 91-400

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	TAL CF
7470A	Mercury (CVAA)	SW846	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF
7470A	Preparation, Mercury	SW846	TAL CF
Filtration	Sample Filtration	None	TAL CF

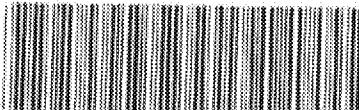
### Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

### Laboratory References:

TAL CF = Eurofins TestAmerica, Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401



## Cooler/Sample Receipt and Temperature Log Form

Client Information	
Client: <i>Grotek Engineering + Testing Service</i>	
City/State:	CITY <i>Sioux Falls</i> STATE <i>SD</i>
Project: <i>Vogels</i>	
Receipt Information	
Date/Time Received:	DATE <i>5/13/20</i> TIME <i>0920</i>
Received By:	<i>JL</i>
Delivery Type:	<input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____
Condition of Cooler/Containers	
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler ID: _____
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Cooler # _____ of _____
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Which VOA samples are in cooler? _____
Temperature Record	
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE
Thermometer ID:	<i>M</i> Correction Factor (°C): <i>+0.1</i>
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature	
Uncorrected Temp (°C):	<i>3.1</i> Corrected Temp (°C): <i>3.2</i>
* Sample Container Temperature	
Container(s) used:	CONTAINER 1 CONTAINER 2
Uncorrected Temp (°C):	
Corrected Temp (°C):	
Exceptions Noted	
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No	
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No	
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No	
NOTE: If yes, contact PM before proceeding. If no, proceed with login	
Additional Comments	

Eurofins TestAmerica, Cedar Falls, Iowa 50610 • 800-338-3838

Chain of Custody Record  
33 eurofins

Cedar Falls, IA 50613-0907

TestAmerica Laboratories, Inc., offers Eurofins TestAmerica

## Login Sample Receipt Checklist

Client: GeoTek Engineering & Testing Services

Job Number: 310-181662-1

SDG Number: 91-400

**Login Number:** 181662

**List Source:** Eurofins TestAmerica, Cedar Falls

**List Number:** 1

**Creator:** Homolar, Dana J

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Environment Testing  
America

## ANALYTICAL REPORT

Eurofins TestAmerica, Cedar Falls  
3019 Venture Way  
Cedar Falls, IA 50613  
Tel: (319)277-2401

Laboratory Job ID: 310-181544-1  
Laboratory Sample Delivery Group: 91-400  
Client Project/Site: Vogel's

For:  
GeoTek Engineering & Testing Services  
909 E. 50th Street  
Sioux Falls, South Dakota 57104

Attn: Keith Delange

A handwritten signature in black ink that reads "Shawn Hayes".

Authorized for release by:  
5/19/2020 7:35:31 PM

Shawn Hayes, Senior Project Manager  
(319)229-8211  
[shawn.hayes@testamericainc.com](mailto:shawn.hayes@testamericainc.com)

### LINKS

Review your project  
results through

**Total Access**

Have a Question?

Ask—  
The  
Expert

Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	6
Definitions . . . . .	14
Surrogate Summary . . . . .	15
QC Sample Results . . . . .	16
QC Association . . . . .	19
Chronicle . . . . .	21
Certification Summary . . . . .	23
Method Summary . . . . .	24
Chain of Custody . . . . .	25
Receipt Checklists . . . . .	27

# Case Narrative

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

**Job ID: 310-181544-1**

**Laboratory: Eurofins TestAmerica, Cedar Falls**

## Narrative

**Job Narrative**  
**310-181544-1**

## Comments

No additional comments.

## Receipt

The samples were received on 5/12/2020 9:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.5° C.

## GC VOA

Method OA-1 (GC): Surrogate recovery for the following samples was outside control limits: TC-6D (310-181544-5) and GMW-9R (310-181544-6). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method OA-1 (GC): The following sample was diluted due to the nature of the sample matrix: TC-6D (310-181544-5). Elevated reporting limits (RLs) are provided for Benzene and Toluene.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

## VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Sample Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-181544-1	GMW-7R	Ground Water	05/11/20 10:30	05/12/20 09:35	
310-181544-2	GMW-13	Ground Water	05/11/20 14:15	05/12/20 09:35	
310-181544-3	GMW-14	Ground Water	05/11/20 14:45	05/12/20 09:35	
310-181544-4	GMW-15	Ground Water	05/11/20 12:35	05/12/20 09:35	
310-181544-5	TC-6D	Ground Water	05/11/20 12:55	05/12/20 09:35	
310-181544-6	GMW-9R	Ground Water	05/11/20 13:15	05/12/20 09:35	
310-181544-7	GMW-20	Ground Water	05/11/20 10:55	05/12/20 09:35	
310-181544-8	GMW-33	Ground Water	05/11/20 11:15	05/12/20 09:35	

# Detection Summary

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogel's

Job ID: 310-181544-1  
 SDG: 91-400

## **Client Sample ID: GMW-7R**

**Lab Sample ID: 310-181544-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00373		0.00200		mg/L	1		6020A	Dissolved

## **Client Sample ID: GMW-13**

**Lab Sample ID: 310-181544-2**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00467		0.00200		mg/L	1		6020A	Dissolved

## **Client Sample ID: GMW-14**

**Lab Sample ID: 310-181544-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00354		0.00200		mg/L	1		6020A	Dissolved
Chromium	0.00754		0.00500		mg/L	1		6020A	Dissolved
Mercury	0.000224		0.000200		mg/L	1		7470A	Dissolved

## **Client Sample ID: GMW-15**

**Lab Sample ID: 310-181544-4**

No Detections.

## **Client Sample ID: TC-6D**

**Lab Sample ID: 310-181544-5**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	8350		40.0	12.2	ug/L	20		OA-1 (GC)	Total/NA
Xylenes, Total	23200		120	60.0	ug/L	20		OA-1 (GC)	Total/NA
Arsenic	0.00628		0.00200		mg/L	1		6020A	Dissolved

## **Client Sample ID: GMW-9R**

**Lab Sample ID: 310-181544-6**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	2.34		2.00		ug/L	1		OA-1 (GC)	Total/NA
Toluene	539		2.00		ug/L	1		OA-1 (GC)	Total/NA
Ethylbenzene	9160		100		ug/L	50		OA-1 (GC)	Total/NA
Xylenes, Total	26500		300		ug/L	50		OA-1 (GC)	Total/NA
Arsenic	0.00394		0.00200		mg/L	1		6020A	Dissolved

## **Client Sample ID: GMW-20**

**Lab Sample ID: 310-181544-7**

No Detections.

## **Client Sample ID: GMW-33**

**Lab Sample ID: 310-181544-8**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

**Client Sample ID: GMW-7R**

**Lab Sample ID: 310-181544-1**

Date Collected: 05/11/20 10:30

Matrix: Ground Water

Date Received: 05/12/20 09:35

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00373		0.00200		mg/L		05/15/20 08:11	05/18/20 17:36	1
Cadmium	<0.000100		0.000100		mg/L		05/15/20 08:11	05/18/20 17:36	1
Chromium	<0.00500		0.00500		mg/L		05/15/20 08:11	05/18/20 17:36	1
Lead	<0.000500		0.000500		mg/L		05/15/20 08:11	05/18/20 17:36	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:55	05/19/20 16:11	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

**Client Sample ID: GMW-13**  
Date Collected: 05/11/20 14:15  
Date Received: 05/12/20 09:35  
Sampler Name: Brett Wetrosky

**Lab Sample ID: 310-181544-2**  
Matrix: Ground Water

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00467		0.00200		mg/L		05/15/20 08:11	05/18/20 17:57	1
Cadmium	<0.000100		0.000100		mg/L		05/15/20 08:11	05/18/20 17:57	1
Chromium	<0.00500		0.00500		mg/L		05/15/20 08:11	05/18/20 17:57	1
Lead	<0.000500		0.000500		mg/L		05/15/20 08:11	05/18/20 17:57	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200	F1	0.000200		mg/L		05/18/20 14:55	05/19/20 16:13	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

**Client Sample ID: GMW-14**  
Date Collected: 05/11/20 14:45  
Date Received: 05/12/20 09:35  
Sampler Name: Brett Wetrosky

**Lab Sample ID: 310-181544-3**  
Matrix: Ground Water

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00354		0.00200		mg/L		05/15/20 08:11	05/18/20 18:00	1
Cadmium	<0.000100		0.000100		mg/L		05/15/20 08:11	05/18/20 18:00	1
Chromium	0.00754		0.00500		mg/L		05/15/20 08:11	05/18/20 18:00	1
Lead	<0.000500		0.000500		mg/L		05/15/20 08:11	05/18/20 18:00	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000224		0.000200		mg/L		05/18/20 14:55	05/19/20 16:20	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

**Client Sample ID: GMW-15**  
Date Collected: 05/11/20 12:35  
Date Received: 05/12/20 09:35  
Sampler Name: Brett Wetrosky

**Lab Sample ID: 310-181544-4**  
Matrix: Ground Water

Sampler Phone Number: 605-335-5512

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		05/15/20 08:11	05/18/20 18:02	1
Cadmium	<0.000100		0.000100		mg/L		05/15/20 08:11	05/18/20 18:02	1
Chromium	<0.00500		0.00500		mg/L		05/15/20 08:11	05/18/20 18:02	1
Lead	<0.000500		0.000500		mg/L		05/15/20 08:11	05/18/20 18:02	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:55	05/19/20 16:26	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogel's

Job ID: 310-181544-1  
 SDG: 91-400

**Client Sample ID: TC-6D**

**Lab Sample ID: 310-181544-5**

Date Collected: 05/11/20 12:55

Matrix: Ground Water

Date Received: 05/12/20 09:35

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<17.4		40.0	17.4	ug/L			05/13/20 04:36	20
Toluene	<17.6		40.0	17.6	ug/L			05/13/20 04:36	20
Ethylbenzene	8350		40.0	12.2	ug/L			05/13/20 04:36	20
Xylenes, Total	23200		120	60.0	ug/L			05/13/20 04:36	20
<b>Surrogate</b>							<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Sur)	157	X		35 - 150				05/13/20 04:36	20

**Method: 6020A - Metals (ICP/MS) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00628		0.00200		mg/L		05/15/20 08:11	05/18/20 18:05	1
Cadmium	<0.000100		0.000100		mg/L		05/15/20 08:11	05/18/20 18:05	1
Chromium	<0.00500		0.00500		mg/L		05/15/20 08:11	05/18/20 18:05	1
Lead	<0.000500		0.000500		mg/L		05/15/20 08:11	05/18/20 18:05	1

**Method: 7470A - Mercury (CVAA) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:55	05/19/20 16:28	1

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogel's

Job ID: 310-181544-1  
 SDG: 91-400

**Client Sample ID: GMW-9R**  
 Date Collected: 05/11/20 13:15  
 Date Received: 05/12/20 09:35  
 Sampler Name: Brett Wetrosky

**Lab Sample ID: 310-181544-6**  
 Matrix: Ground Water

Sampler Phone Number: 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2.34		2.00		ug/L			05/13/20 05:08	1
Toluene	539		2.00		ug/L			05/13/20 05:08	1
Ethylbenzene	9160		100		ug/L			05/13/20 19:19	50
Xylenes, Total	26500		300		ug/L			05/13/20 19:19	50

## Surrogate %Recovery Qualifier Limits

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Sur)	925	X	35 - 150		05/13/20 05:08	1
4-Bromofluorobenzene (Sur)	115		35 - 150		05/13/20 19:19	50

## Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00394		0.00200		mg/L		05/15/20 08:11	05/18/20 18:08	1
Cadmium	<0.000100		0.000100		mg/L		05/15/20 08:11	05/18/20 18:08	1
Chromium	<0.00500		0.00500		mg/L		05/15/20 08:11	05/18/20 18:08	1
Lead	<0.000500		0.000500		mg/L		05/15/20 08:11	05/18/20 18:08	1

## Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:55	05/19/20 16:30	1

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

**Client Sample ID:** GMW-20  
**Date Collected:** 05/11/20 10:55  
**Date Received:** 05/12/20 09:35  
**Sampler Name:** Brett Wetrosky

**Lab Sample ID:** 310-181544-7  
**Matrix:** Ground Water

**Sampler Phone Number:** 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			05/13/20 03:33	1
Toluene	<2.00		2.00		ug/L			05/13/20 03:33	1
Ethylbenzene	<2.00		2.00		ug/L			05/13/20 03:33	1
Xylenes, Total	<6.00		6.00		ug/L			05/13/20 03:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Sur)	101		35 - 150					05/13/20 03:33	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

**Client Sample ID:** GMW-33  
**Date Collected:** 05/11/20 11:15  
**Date Received:** 05/12/20 09:35  
**Sampler Name:** Brett Wetrosky

**Lab Sample ID:** 310-181544-8  
**Matrix:** Ground Water

**Sampler Phone Number:** 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			05/13/20 04:04	1
Toluene	<2.00		2.00		ug/L			05/13/20 04:04	1
Ethylbenzene	<2.00		2.00		ug/L			05/13/20 04:04	1
Xylenes, Total	<6.00		6.00		ug/L			05/13/20 04:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Sur)	103		35 - 150					05/13/20 04:04	1

# Definitions/Glossary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

## Qualifiers

### GC VOA

#### Qualifier

X

#### Qualifier Description

Surrogate recovery exceeds control limits

### Metals

#### Qualifier

F1

#### Qualifier Description

MS and/or MSD recovery exceeds control limits.

## Glossary

### Abbreviation

These commonly used abbreviations may or may not be present in this report.

D Listed under the "D" column to designate that the result is reported on a dry weight basis

%R Percent Recovery

CFL Contains Free Liquid

CNF Contains No Free Liquid

DER Duplicate Error Ratio (normalized absolute difference)

Dil Fac Dilution Factor

DL Detection Limit (DoD/DOE)

DL, RA, RE, IN Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

DLC Decision Level Concentration (Radiochemistry)

EDL Estimated Detection Limit (Dioxin)

LOD Limit of Detection (DoD/DOE)

LOQ Limit of Quantitation (DoD/DOE)

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit

ML Minimum Level (Dioxin)

MQL Method Quantitation Limit

NC Not Calculated

ND Not Detected at the reporting limit (or MDL or EDL if shown)

PQL Practical Quantitation Limit

QC Quality Control

RER Relative Error Ratio (Radiochemistry)

RL Reporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

TEF Toxicity Equivalent Factor (Dioxin)

TEQ Toxicity Equivalent Quotient (Dioxin)

# Surrogate Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Ground Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	BFB (35-150)	Percent Surrogate Recovery (Acceptance Limits)				
			157 X	925 X	115	101	103
310-181544-5	TC-6D	157 X					
310-181544-6	GMW-9R	925 X					
310-181544-6	GMW-9R	115					
310-181544-7	GMW-20	101					
310-181544-8	GMW-33	103					

**Surrogate Legend**  
BFB = 4-Bromofluorobenzene (Surr)

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	BFB (35-150)	Percent Surrogate Recovery (Acceptance Limits)				
			100	100	98	88	
LCS 310-278581/5	Lab Control Sample	100					
LCS 310-278729/5	Lab Control Sample	100					
MB 310-278581/4	Method Blank	98					
MB 310-278729/4	Method Blank	88					

**Surrogate Legend**  
BFB = 4-Bromofluorobenzene (Surr)

# QC Sample Results

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogel's

Job ID: 310-181544-1  
 SDG: 91-400

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

**Lab Sample ID:** MB 310-278581/4

**Matrix:** Water

**Analysis Batch:** 278581

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier									
Benzene	<0.870				2.00	0.870	ug/L			05/12/20 18:30	1
Toluene	<0.880				2.00	0.880	ug/L			05/12/20 18:30	1
Ethylbenzene	<0.610				2.00	0.610	ug/L			05/12/20 18:30	1
Xylenes, Total	<3.00				6.00	3.00	ug/L			05/12/20 18:30	1
<b>Surrogate</b>		MB	MB	%Recovery	Qualifier	<b>Limits</b>		D	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Sur)		98				35 - 150					

**Lab Sample ID:** LCS 310-278581/5

**Matrix:** Water

**Analysis Batch:** 278581

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA

Analyte	MB	MB	Spike	Result	LCS	LCS	Unit	D	%Rec.	Limits	
	Result	Qualifier									
Benzene			80.0	75.01			ug/L		94	75 - 120	
Toluene			80.0	75.62			ug/L		95	76 - 120	
Ethylbenzene			80.0	76.29			ug/L		95	77 - 120	
Xylenes, Total			240	229.7			ug/L		96	76 - 121	
<b>Surrogate</b>		MB	MB	%Recovery	Qualifier	<b>Limits</b>		D	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Sur)		100				35 - 150					

**Lab Sample ID:** MB 310-278729/4

**Matrix:** Water

**Analysis Batch:** 278729

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier									
Benzene	<0.870				2.00	0.870	ug/L			05/13/20 18:15	1
Toluene	<0.880				2.00	0.880	ug/L			05/13/20 18:15	1
Ethylbenzene	<0.610				2.00	0.610	ug/L			05/13/20 18:15	1
Xylenes, Total	<3.00				6.00	3.00	ug/L			05/13/20 18:15	1
<b>Surrogate</b>		MB	MB	%Recovery	Qualifier	<b>Limits</b>		D	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Sur)		88				35 - 150					

**Lab Sample ID:** LCS 310-278729/5

**Matrix:** Water

**Analysis Batch:** 278729

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA

Analyte	MB	MB	Spike	Result	LCS	LCS	Unit	D	%Rec.	Limits	
	Result	Qualifier									
Benzene			80.0	72.59			ug/L		91	75 - 120	
Toluene			80.0	73.21			ug/L		92	76 - 120	
Ethylbenzene			80.0	73.99			ug/L		92	77 - 120	
Xylenes, Total			240	223.5			ug/L		93	76 - 121	
<b>Surrogate</b>		MB	MB	%Recovery	Qualifier	<b>Limits</b>		D	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Sur)		100				35 - 150					

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogel's

Job ID: 310-181544-1  
 SDG: 91-400

## Method: 6020A - Metals (ICP/MS)

**Lab Sample ID:** MB 310-278648/1-B

**Matrix:** Water

**Analysis Batch:** 279310

**Client Sample ID:** Method Blank

**Prep Type:** Dissolved

**Prep Batch:** 278939

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		05/15/20 08:11	05/18/20 17:31	1
Cadmium	<0.000100		0.000100		mg/L		05/15/20 08:11	05/18/20 17:31	1
Chromium	<0.00500		0.00500		mg/L		05/15/20 08:11	05/18/20 17:31	1
Lead	<0.000500		0.000500		mg/L		05/15/20 08:11	05/18/20 17:31	1

**Lab Sample ID:** LCS 310-278648/2-B

**Matrix:** Water

**Analysis Batch:** 279310

**Client Sample ID:** Lab Control Sample

**Prep Type:** Dissolved

**Prep Batch:** 278939

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.0800	0.07172		mg/L		90	80 - 120
Cadmium	0.0400	0.04182		mg/L		105	80 - 120
Chromium	0.0800	0.07794		mg/L		97	80 - 120
Lead	0.0400	0.04338		mg/L		108	80 - 120

**Lab Sample ID:** 310-181544-1 MS

**Matrix:** Ground Water

**Analysis Batch:** 279310

**Client Sample ID:** GMW-7R

**Prep Type:** Dissolved

**Prep Batch:** 278939

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.00373		0.0800	0.07850		mg/L		93	75 - 125
Cadmium	<0.000100		0.0400	0.04309		mg/L		108	75 - 125
Chromium	<0.00500		0.0800	0.08053		mg/L		101	75 - 125
Lead	<0.000500		0.0400	0.04221		mg/L		106	75 - 125

**Lab Sample ID:** 310-181544-1 MSD

**Matrix:** Ground Water

**Analysis Batch:** 279310

**Client Sample ID:** GMW-7R

**Prep Type:** Dissolved

**Prep Batch:** 278939

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	0.00373		0.0800	0.07876		mg/L		94	75 - 125	0	20
Cadmium	<0.000100		0.0400	0.04294		mg/L		107	75 - 125	0	20
Chromium	<0.00500		0.0800	0.07996		mg/L		100	75 - 125	1	20
Lead	<0.000500		0.0400	0.04224		mg/L		106	75 - 125	0	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID:** MB 310-278649/1-B

**Matrix:** Water

**Analysis Batch:** 279423

**Client Sample ID:** Method Blank

**Prep Type:** Dissolved

**Prep Batch:** 279241

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/18/20 14:55	05/19/20 16:07	1

**Lab Sample ID:** LCS 310-278649/2-B

**Matrix:** Water

**Analysis Batch:** 279423

**Client Sample ID:** Lab Control Sample

**Prep Type:** Dissolved

**Prep Batch:** 279241

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00167	0.001606		mg/L		96	80 - 120

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

## Method: 7470A - Mercury (CVAA)

Lab Sample ID: 310-181544-2 MS

Matrix: Ground Water

Analysis Batch: 279423

Client Sample ID: GMW-13

Prep Type: Dissolved

Prep Batch: 279241

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	<0.000200	F1	0.00167	0.001254	F1	mg/L	75	80 - 120	

Lab Sample ID: 310-181544-2 MSD

Matrix: Ground Water

Analysis Batch: 279423

Client Sample ID: GMW-13

Prep Type: Dissolved

Prep Batch: 279241

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	<0.000200	F1	0.00167	0.001397		mg/L	84	80 - 120		11	20

# QC Association Summary

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogel's

Job ID: 310-181544-1  
 SDG: 91-400

## GC VOA

### Analysis Batch: 278581

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181544-5	TC-6D	Total/NA	Ground Water	OA-1 (GC)	
310-181544-6	GMW-9R	Total/NA	Ground Water	OA-1 (GC)	
310-181544-7	GMW-20	Total/NA	Ground Water	OA-1 (GC)	
310-181544-8	GMW-33	Total/NA	Ground Water	OA-1 (GC)	
MB 310-278581/4	Method Blank	Total/NA	Water	OA-1 (GC)	
LCS 310-278581/5	Lab Control Sample	Total/NA	Water	OA-1 (GC)	

### Analysis Batch: 278729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181544-6	GMW-9R	Total/NA	Ground Water	OA-1 (GC)	
MB 310-278729/4	Method Blank	Total/NA	Water	OA-1 (GC)	
LCS 310-278729/5	Lab Control Sample	Total/NA	Water	OA-1 (GC)	

## Metals

### Filtration Batch: 278648

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181544-1	GMW-7R	Dissolved	Ground Water	Filtration	
310-181544-2	GMW-13	Dissolved	Ground Water	Filtration	
310-181544-3	GMW-14	Dissolved	Ground Water	Filtration	
310-181544-4	GMW-15	Dissolved	Ground Water	Filtration	
310-181544-5	TC-6D	Dissolved	Ground Water	Filtration	
310-181544-6	GMW-9R	Dissolved	Ground Water	Filtration	
MB 310-278648/1-B	Method Blank	Dissolved	Water	Filtration	
LCS 310-278648/2-B	Lab Control Sample	Dissolved	Water	Filtration	
310-181544-1 MS	GMW-7R	Dissolved	Ground Water	Filtration	
310-181544-1 MSD	GMW-7R	Dissolved	Ground Water	Filtration	

### Filtration Batch: 278649

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181544-1	GMW-7R	Dissolved	Ground Water	Filtration	
310-181544-2	GMW-13	Dissolved	Ground Water	Filtration	
310-181544-3	GMW-14	Dissolved	Ground Water	Filtration	
310-181544-4	GMW-15	Dissolved	Ground Water	Filtration	
310-181544-5	TC-6D	Dissolved	Ground Water	Filtration	
310-181544-6	GMW-9R	Dissolved	Ground Water	Filtration	
MB 310-278649/1-B	Method Blank	Dissolved	Water	Filtration	
LCS 310-278649/2-B	Lab Control Sample	Dissolved	Water	Filtration	
310-181544-2 MS	GMW-13	Dissolved	Ground Water	Filtration	
310-181544-2 MSD	GMW-13	Dissolved	Ground Water	Filtration	

### Prep Batch: 278939

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181544-1	GMW-7R	Dissolved	Ground Water	3010A	278648
310-181544-2	GMW-13	Dissolved	Ground Water	3010A	278648
310-181544-3	GMW-14	Dissolved	Ground Water	3010A	278648
310-181544-4	GMW-15	Dissolved	Ground Water	3010A	278648
310-181544-5	TC-6D	Dissolved	Ground Water	3010A	278648
310-181544-6	GMW-9R	Dissolved	Ground Water	3010A	278648
MB 310-278648/1-B	Method Blank	Dissolved	Water	3010A	278648
LCS 310-278648/2-B	Lab Control Sample	Dissolved	Water	3010A	278648

Eurofins TestAmerica, Cedar Falls

# QC Association Summary

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogel's

Job ID: 310-181544-1  
 SDG: 91-400

## Metals (Continued)

### Prep Batch: 278939 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181544-1 MS	GMW-7R	Dissolved	Ground Water	3010A	278648
310-181544-1 MSD	GMW-7R	Dissolved	Ground Water	3010A	278648

### Prep Batch: 279241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181544-1	GMW-7R	Dissolved	Ground Water	7470A	278649
310-181544-2	GMW-13	Dissolved	Ground Water	7470A	278649
310-181544-3	GMW-14	Dissolved	Ground Water	7470A	278649
310-181544-4	GMW-15	Dissolved	Ground Water	7470A	278649
310-181544-5	TC-6D	Dissolved	Ground Water	7470A	278649
310-181544-6	GMW-9R	Dissolved	Ground Water	7470A	278649
MB 310-278649/1-B	Method Blank	Dissolved	Water	7470A	278649
LCS 310-278649/2-B	Lab Control Sample	Dissolved	Water	7470A	278649
310-181544-2 MS	GMW-13	Dissolved	Ground Water	7470A	278649
310-181544-2 MSD	GMW-13	Dissolved	Ground Water	7470A	278649

### Analysis Batch: 279310

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181544-1	GMW-7R	Dissolved	Ground Water	6020A	278939
310-181544-2	GMW-13	Dissolved	Ground Water	6020A	278939
310-181544-3	GMW-14	Dissolved	Ground Water	6020A	278939
310-181544-4	GMW-15	Dissolved	Ground Water	6020A	278939
310-181544-5	TC-6D	Dissolved	Ground Water	6020A	278939
310-181544-6	GMW-9R	Dissolved	Ground Water	6020A	278939
MB 310-278648/1-B	Method Blank	Dissolved	Water	6020A	278939
LCS 310-278648/2-B	Lab Control Sample	Dissolved	Water	6020A	278939
310-181544-1 MS	GMW-7R	Dissolved	Ground Water	6020A	278939
310-181544-1 MSD	GMW-7R	Dissolved	Ground Water	6020A	278939

### Analysis Batch: 279423

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181544-1	GMW-7R	Dissolved	Ground Water	7470A	279241
310-181544-2	GMW-13	Dissolved	Ground Water	7470A	279241
310-181544-3	GMW-14	Dissolved	Ground Water	7470A	279241
310-181544-4	GMW-15	Dissolved	Ground Water	7470A	279241
310-181544-5	TC-6D	Dissolved	Ground Water	7470A	279241
310-181544-6	GMW-9R	Dissolved	Ground Water	7470A	279241
MB 310-278649/1-B	Method Blank	Dissolved	Water	7470A	279241
LCS 310-278649/2-B	Lab Control Sample	Dissolved	Water	7470A	279241
310-181544-2 MS	GMW-13	Dissolved	Ground Water	7470A	279241
310-181544-2 MSD	GMW-13	Dissolved	Ground Water	7470A	279241

# Lab Chronicle

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogel's

Job ID: 310-181544-1  
 SDG: 91-400

**Client Sample ID: GMW-7R**  
 Date Collected: 05/11/20 10:30  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181544-1**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			278648	05/13/20 08:31	HED	TAL CF
Dissolved	Prep	3010A			278939	05/15/20 08:11	HED	TAL CF
Dissolved	Analysis	6020A		1	279310	05/18/20 17:36	SAD	TAL CF
Dissolved	Filtration	Filtration			278649	05/13/20 08:33	HED	TAL CF
Dissolved	Prep	7470A			279241	05/18/20 14:55	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 16:11	HIS	TAL CF

**Client Sample ID: GMW-13**  
 Date Collected: 05/11/20 14:15  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181544-2**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			278648	05/13/20 08:32	HED	TAL CF
Dissolved	Prep	3010A			278939	05/15/20 08:11	HED	TAL CF
Dissolved	Analysis	6020A		1	279310	05/18/20 17:57	SAD	TAL CF
Dissolved	Filtration	Filtration			278649	05/13/20 08:33	HED	TAL CF
Dissolved	Prep	7470A			279241	05/18/20 14:55	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 16:13	HIS	TAL CF

**Client Sample ID: GMW-14**  
 Date Collected: 05/11/20 14:45  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181544-3**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			278648	05/13/20 08:32	HED	TAL CF
Dissolved	Prep	3010A			278939	05/15/20 08:11	HED	TAL CF
Dissolved	Analysis	6020A		1	279310	05/18/20 18:00	SAD	TAL CF
Dissolved	Filtration	Filtration			278649	05/13/20 08:33	HED	TAL CF
Dissolved	Prep	7470A			279241	05/18/20 14:55	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 16:20	HIS	TAL CF

**Client Sample ID: GMW-15**  
 Date Collected: 05/11/20 12:35  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181544-4**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	Filtration			278648	05/13/20 08:32	HED	TAL CF
Dissolved	Prep	3010A			278939	05/15/20 08:11	HED	TAL CF
Dissolved	Analysis	6020A		1	279310	05/18/20 18:02	SAD	TAL CF
Dissolved	Filtration	Filtration			278649	05/13/20 08:33	HED	TAL CF
Dissolved	Prep	7470A			279241	05/18/20 14:55	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 16:26	HIS	TAL CF

Eurofins TestAmerica, Cedar Falls

# Lab Chronicle

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogel's

Job ID: 310-181544-1  
 SDG: 91-400

**Client Sample ID: TC-6D**

Date Collected: 05/11/20 12:55  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181544-5**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		20	278581	05/13/20 04:36	CMM	TAL CF
Dissolved	Filtration	Filtration			278648	05/13/20 08:32	HED	TAL CF
Dissolved	Prep	3010A			278939	05/15/20 08:11	HED	TAL CF
Dissolved	Analysis	6020A		1	279310	05/18/20 18:05	SAD	TAL CF
Dissolved	Filtration	Filtration			278649	05/13/20 08:33	HED	TAL CF
Dissolved	Prep	7470A			279241	05/18/20 14:55	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 16:28	HIS	TAL CF

**Client Sample ID: GMW-9R**

Date Collected: 05/11/20 13:15  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181544-6**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	278581	05/13/20 05:08	CMM	TAL CF
Total/NA	Analysis	OA-1 (GC)		50	278729	05/13/20 19:19	CMM	TAL CF
Dissolved	Filtration	Filtration			278648	05/13/20 08:32	HED	TAL CF
Dissolved	Prep	3010A			278939	05/15/20 08:11	HED	TAL CF
Dissolved	Analysis	6020A		1	279310	05/18/20 18:08	SAD	TAL CF
Dissolved	Filtration	Filtration			278649	05/13/20 08:33	HED	TAL CF
Dissolved	Prep	7470A			279241	05/18/20 14:55	HIS	TAL CF
Dissolved	Analysis	7470A		1	279423	05/19/20 16:30	HIS	TAL CF

**Client Sample ID: GMW-20**

Date Collected: 05/11/20 10:55  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181544-7**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	278581	05/13/20 03:33	CMM	TAL CF

**Client Sample ID: GMW-33**

Date Collected: 05/11/20 11:15  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181544-8**  
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	278581	05/13/20 04:04	CMM	TAL CF

## Laboratory References:

TAL CF = Eurofins TestAmerica, Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Eurofins TestAmerica, Cedar Falls

## Accreditation/Certification Summary

Client: GeoTek Engineering & Testing Services

Project/Site: Vogel's

Job ID: 310-181544-1

SDG: 91-400

### Laboratory: Eurofins TestAmerica, Cedar Falls

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	101044	11-01-20
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-20
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-20
Georgia	State	IA100001 (OR)	09-29-20
Illinois	NELAP	200024	11-29-20
Iowa	State	007	12-01-21
Kansas	NELAP	E-10341	01-31-21
Minnesota	NELAP	019-999-319	12-31-20
Minnesota (Petrofund)	State	3349	08-22-21
North Dakota	State	R-186	09-30-20
Oregon	NELAP	IA100001	09-29-20
USDA	US Federal Programs	P330-19-00003	01-02-22

Eurofins TestAmerica, Cedar Falls

# Method Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogel's

Job ID: 310-181544-1  
SDG: 91-400

Method	Method Description	Protocol	Laboratory
OA-1 (GC)	Volatile Petroleum Hydrocarbons (GC)	Iowa DNR	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
7470A	Mercury (CVAA)	SW846	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF
5030B	Purge and Trap	SW846	TAL CF
7470A	Preparation, Mercury	SW846	TAL CF
Filtration	Sample Filtration	None	TAL CF

## Protocol References:

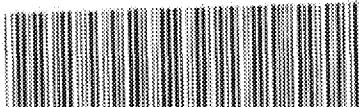
Iowa DNR = Iowa Department of Natural Resources

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

## Laboratory References:

TAL CF = Eurofins TestAmerica, Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Environment Testing  
TestAmerica

310-181544 Chain of Custody

## Cooler/Sample Receipt and Temperature Log Form

Client Information	
Client: Geotek Engineering	
City/State:	Sioux Falls SD
Project:	Vmellis
Received Information	
Date/Time Received:	DATE 3/6/20 TIME 0935
Received By:	R
Delivery Type:	<input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other:
Condition of Cooler/Coolant	
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler ID:
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Cooler # ____ of ____
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Which VOA samples are in cooler? 1
Temperature Record	
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE
Thermometer ID:	M Correction Factor (°C): +0.1
Uncorrected Temp (°C):	0.4 Corrected Temp (°C): 0.5
Sample Container Temperature	
Container(s) used:	CONTAINER 1 CONTAINER 2
Uncorrected Temp (°C):	
Corrected Temp (°C):	
Exceptions Note	
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No	
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No	
NOTE: If yes, contact PM before proceeding. If no, proceed with login	
Additional Comments	
* _____	



## Login Sample Receipt Checklist

Client: GeoTek Engineering & Testing Services

Job Number: 310-181544-1

SDG Number: 91-400

**Login Number:** 181544

**List Source:** Eurofins TestAmerica, Cedar Falls

**List Number:** 1

**Creator:** Johnson, Josie A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Environment Testing  
America

## ANALYTICAL REPORT

Eurofins TestAmerica, Cedar Falls  
3019 Venture Way  
Cedar Falls, IA 50613  
Tel: (319)277-2401

Laboratory Job ID: 310-180277-1  
Laboratory Sample Delivery Group: 91-400  
Client Project/Site: Vogels

For:  
GeoTek Engineering & Testing Services  
909 E. 50th Street  
Sioux Falls, South Dakota 57104

Attn: Keith Delange

Authorized for release by:  
5/4/2020 9:58:00 AM

Shawn Hayes, Senior Project Manager  
(319)229-8211  
[shawn.hayes@testamericainc.com](mailto:shawn.hayes@testamericainc.com)

### LINKS

Review your project  
results through

**Total Access**

Have a Question?

Ask—  
The  
Expert

Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	7
Definitions . . . . .	19
Surrogate Summary . . . . .	20
QC Sample Results . . . . .	21
QC Association . . . . .	23
Chronicle . . . . .	24
Certification Summary . . . . .	26
Method Summary . . . . .	27
Chain of Custody . . . . .	28
Receipt Checklists . . . . .	30

## Case Narrative

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Job ID:** 310-180277-1

**Laboratory:** Eurofins TestAmerica, Cedar Falls

### Narrative

Job Narrative  
310-180277-1

### Comments

No additional comments.

### Receipt

The samples were received on 4/23/2020 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.4° C.

### GC VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

### VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

## Sample Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-180277-1	GMW37	Water	04/22/20 10:46	04/23/20 09:40	
310-180277-2	GMW36	Water	04/22/20 11:07	04/23/20 09:40	
310-180277-3	GMW35	Water	04/22/20 11:27	04/23/20 09:40	
310-180277-4	GMW41	Water	04/22/20 11:50	04/23/20 09:40	
310-180277-5	GMW38	Water	04/22/20 12:10	04/23/20 09:40	
310-180277-6	GMW42	Water	04/22/20 12:35	04/23/20 09:40	
310-180277-7	GMW39	Water	04/22/20 12:55	04/23/20 09:40	
310-180277-8	GMW30	Water	04/22/20 13:15	04/23/20 09:40	
310-180277-9	GMW25	Water	04/22/20 13:45	04/23/20 09:40	
310-180277-10	GMW40	Water	04/22/20 14:08	04/23/20 09:40	
310-180277-11	GMW44	Water	04/22/20 14:28	04/23/20 09:40	
310-180277-12	GMW19	Water	04/22/20 14:45	04/23/20 09:40	

## Detection Summary

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogels

Job ID: 310-180277-1  
 SDG: 91-400

**Client Sample ID: GMW37**

**Lab Sample ID: 310-180277-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	3.56		2.00		ug/L	1		OA-1 (GC)	Total/NA
Xylenes, Total	16.1		6.00		ug/L	1		OA-1 (GC)	Total/NA

**Client Sample ID: GMW36**

**Lab Sample ID: 310-180277-2**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	2.48		2.00		ug/L	1		OA-1 (GC)	Total/NA
Xylenes, Total	11.2		6.00		ug/L	1		OA-1 (GC)	Total/NA

**Client Sample ID: GMW35**

**Lab Sample ID: 310-180277-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	2.40		2.00		ug/L	1		OA-1 (GC)	Total/NA
Xylenes, Total	10.7		6.00		ug/L	1		OA-1 (GC)	Total/NA

**Client Sample ID: GMW41**

**Lab Sample ID: 310-180277-4**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	2.31		2.00		ug/L	1		OA-1 (GC)	Total/NA
Xylenes, Total	9.86		6.00		ug/L	1		OA-1 (GC)	Total/NA

**Client Sample ID: GMW38**

**Lab Sample ID: 310-180277-5**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Xylenes, Total	8.50		6.00		ug/L	1		OA-1 (GC)	Total/NA

**Client Sample ID: GMW42**

**Lab Sample ID: 310-180277-6**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	2.03		2.00		ug/L	1		OA-1 (GC)	Total/NA
Xylenes, Total	8.73		6.00		ug/L	1		OA-1 (GC)	Total/NA

**Client Sample ID: GMW39**

**Lab Sample ID: 310-180277-7**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Xylenes, Total	9.05		6.00		ug/L	1		OA-1 (GC)	Total/NA

**Client Sample ID: GMW30**

**Lab Sample ID: 310-180277-8**

No Detections.

**Client Sample ID: GMW25**

**Lab Sample ID: 310-180277-9**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Xylenes, Total	6.91		6.00		ug/L	1		OA-1 (GC)	Total/NA

**Client Sample ID: GMW40**

**Lab Sample ID: 310-180277-10**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Xylenes, Total	7.61		6.00		ug/L	1		OA-1 (GC)	Total/NA

**Client Sample ID: GMW44**

**Lab Sample ID: 310-180277-11**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Xylenes, Total	7.55		6.00		ug/L	1		OA-1 (GC)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

## Detection Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID: GMW19**

**Lab Sample ID: 310-180277-12**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID:** GMW37

**Lab Sample ID:** 310-180277-1

Date Collected: 04/22/20 10:46

Matrix: Water

Date Received: 04/23/20 09:40

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 00:26	1
Toluene	<2.00		2.00		ug/L			04/30/20 00:26	1
Ethylbenzene	3.56		2.00		ug/L			04/30/20 00:26	1
Xylenes, Total	16.1		6.00		ug/L			04/30/20 00:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Sur)	123		35 - 150					04/30/20 00:26	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID:** GMW36  
**Date Collected:** 04/22/20 11:07  
**Date Received:** 04/23/20 09:40  
**Sampler Name:** Brett Wetrosky

**Lab Sample ID:** 310-180277-2

Matrix: Water

Sampler Phone Number: 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 02:34	1
Toluene	<2.00		2.00		ug/L			04/30/20 02:34	1
Ethylbenzene	2.48		2.00		ug/L			04/30/20 02:34	1
Xylenes, Total	11.2		6.00		ug/L			04/30/20 02:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	111		35 - 150					04/30/20 02:34	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID:** GMW35  
**Date Collected:** 04/22/20 11:27  
**Date Received:** 04/23/20 09:40  
**Sampler Name:** Brett Wetrosky

**Lab Sample ID:** 310-180277-3

**Matrix:** Water

**Sampler Phone Number:** 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 03:06	1
Toluene	<2.00		2.00		ug/L			04/30/20 03:06	1
Ethylbenzene	2.40		2.00		ug/L			04/30/20 03:06	1
Xylenes, Total	10.7		6.00		ug/L			04/30/20 03:06	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	117		35 - 150					04/30/20 03:06	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID: GMW41**

**Lab Sample ID: 310-180277-4**

Date Collected: 04/22/20 11:50

Matrix: Water

Date Received: 04/23/20 09:40

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 03:38	1
Toluene	<2.00		2.00		ug/L			04/30/20 03:38	1
Ethylbenzene	2.31		2.00		ug/L			04/30/20 03:38	1
Xylenes, Total	9.86		6.00		ug/L			04/30/20 03:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	125		35 - 150					04/30/20 03:38	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID:** GMW38  
**Date Collected:** 04/22/20 12:10  
**Date Received:** 04/23/20 09:40  
**Sampler Name:** Brett Wetrosky

**Lab Sample ID:** 310-180277-5

**Matrix:** Water

**Sampler Phone Number:** 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 04:09	1
Toluene	<2.00		2.00		ug/L			04/30/20 04:09	1
Ethylbenzene	<2.00		2.00		ug/L			04/30/20 04:09	1
Xylenes, Total	8.50		6.00		ug/L			04/30/20 04:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	116		35 - 150					04/30/20 04:09	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID:** GMW42  
**Date Collected:** 04/22/20 12:35  
**Date Received:** 04/23/20 09:40  
**Sampler Name:** Brett Wetrosky

**Lab Sample ID:** 310-180277-6

**Matrix:** Water

**Sampler Phone Number:** 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 20:29	1
Toluene	<2.00		2.00		ug/L			04/30/20 20:29	1
Ethylbenzene	2.03		2.00		ug/L			04/30/20 20:29	1
Xylenes, Total	8.73		6.00		ug/L			04/30/20 20:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	118		35 - 150					04/30/20 20:29	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

Client Sample ID: GMW39

Lab Sample ID: 310-180277-7

Date Collected: 04/22/20 12:55

Matrix: Water

Date Received: 04/23/20 09:40

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 21:00	1
Toluene	<2.00		2.00		ug/L			04/30/20 21:00	1
Ethylbenzene	<2.00		2.00		ug/L			04/30/20 21:00	1
Xylenes, Total	9.05		6.00		ug/L			04/30/20 21:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	119		35 - 150					04/30/20 21:00	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID:** GMW30  
**Date Collected:** 04/22/20 13:15  
**Date Received:** 04/23/20 09:40  
**Sampler Name:** Brett Wetrosky

**Lab Sample ID:** 310-180277-8

**Matrix:** Water

**Sampler Phone Number:** 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 21:32	1
Toluene	<2.00		2.00		ug/L			04/30/20 21:32	1
Ethylbenzene	<2.00		2.00		ug/L			04/30/20 21:32	1
Xylenes, Total	<6.00		6.00		ug/L			04/30/20 21:32	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	114		35 - 150					04/30/20 21:32	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID:** GMW25  
**Date Collected:** 04/22/20 13:45  
**Date Received:** 04/23/20 09:40  
**Sampler Name:** Brett Wetrosky

**Lab Sample ID:** 310-180277-9

**Matrix:** Water

**Sampler Phone Number:** 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 22:03	1
Toluene	<2.00		2.00		ug/L			04/30/20 22:03	1
Ethylbenzene	<2.00		2.00		ug/L			04/30/20 22:03	1
Xylenes, Total	6.91		6.00		ug/L			04/30/20 22:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	116		35 - 150		04/30/20 22:03	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

Client Sample ID: GMW40

Lab Sample ID: 310-180277-10

Date Collected: 04/22/20 14:08

Matrix: Water

Date Received: 04/23/20 09:40

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 22:35	1
Toluene	<2.00		2.00		ug/L			04/30/20 22:35	1
Ethylbenzene	<2.00		2.00		ug/L			04/30/20 22:35	1
Xylenes, Total	7.61		6.00		ug/L			04/30/20 22:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	114		35 - 150					04/30/20 22:35	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID: GMW44**

**Lab Sample ID: 310-180277-11**

Date Collected: 04/22/20 14:28

Matrix: Water

Date Received: 04/23/20 09:40

Sampler Name: Brett Wetrosky

Sampler Phone Number: 605-335-5512

**Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 23:06	1
Toluene	<2.00		2.00		ug/L			04/30/20 23:06	1
Ethylbenzene	<2.00		2.00		ug/L			04/30/20 23:06	1
Xylenes, Total	7.55		6.00		ug/L			04/30/20 23:06	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	116		35 - 150					04/30/20 23:06	1

# Client Sample Results

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

Client Sample ID: GMW19  
Date Collected: 04/22/20 14:45  
Date Received: 04/23/20 09:40  
Sampler Name: Brett Wetrosky

Lab Sample ID: 310-180277-12  
Matrix: Water  
Sampler Phone Number: 605-335-5512

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			04/30/20 23:38	1
Toluene	<2.00		2.00		ug/L			04/30/20 23:38	1
Ethylbenzene	<2.00		2.00		ug/L			04/30/20 23:38	1
Xylenes, Total	<6.00		6.00		ug/L			04/30/20 23:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surf)	114		35 - 150					04/30/20 23:38	1

## Definitions/Glossary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## Surrogate Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

### Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Water

Prep Type: Total/NA

#### Percent Surrogate Recovery (Acceptance Limits)

##### BFB

Lab Sample ID	Client Sample ID	(35-150)
310-180277-1	GMW37	123
310-180277-1 MS	GMW37	133
310-180277-1 MSD	GMW37	118
310-180277-2	GMW36	111
310-180277-3	GMW35	117
310-180277-4	GMW41	125
310-180277-5	GMW38	116
310-180277-6	GMW42	118
310-180277-6 MS	GMW42	120
310-180277-6 MSD	GMW42	111
310-180277-7	GMW39	119
310-180277-8	GMW30	114
310-180277-9	GMW25	116
310-180277-10	GMW40	114
310-180277-11	GMW44	116
310-180277-12	GMW19	114
LCS 310-277254/11	Lab Control Sample	117
LCS 310-277397/5	Lab Control Sample	118
MB 310-277254/5	Method Blank	113
MB 310-277397/4	Method Blank	101

#### Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

# QC Sample Results

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogels

Job ID: 310-180277-1  
 SDG: 91-400

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Lab Sample ID: MB 310-277254/5

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Matrix: Water

Analysis Batch: 277254

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	<2.00		2.00		ug/L			04/29/20 17:34	1
Toluene	<2.00		2.00		ug/L			04/29/20 17:34	1
Ethylbenzene	<2.00		2.00		ug/L			04/29/20 17:34	1
Xylenes, Total	<6.00		6.00		ug/L			04/29/20 17:34	1
Surrogate	MB		Limits				Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier							
4-Bromofluorobenzene (Surr)	113		35 - 150					04/29/20 17:34	1

Lab Sample ID: LCS 310-277254/11

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Matrix: Water

Analysis Batch: 277254

Analyte	Spike		Result	LCS Qualifier	Unit	D	%Rec	Limits
	Added							
Benzene	80.0		72.84		ug/L		91	75 - 120
Toluene	80.0		73.52		ug/L		92	76 - 120
Ethylbenzene	80.0		75.61		ug/L		95	77 - 120
Xylenes, Total	240		232.4		ug/L		97	76 - 121
Surrogate	LCS		Limits					
	%Recovery	Qualifier						
4-Bromofluorobenzene (Surr)	117		35 - 150					

Lab Sample ID: 310-180277-1 MS

Client Sample ID: GMW37  
 Prep Type: Total/NA

Matrix: Water

Analysis Batch: 277254

Analyte	Sample		Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Added	Result				
Benzene	<2.00		80.0	71.89		ug/L		90	47 - 120
Toluene	<2.00		80.0	72.31		ug/L		89	52 - 120
Ethylbenzene	3.56		80.0	75.01		ug/L		89	48 - 120
Xylenes, Total	16.1		240	231.7		ug/L		90	43 - 123
Surrogate	MS		Limits						
	%Recovery	Qualifier							
4-Bromofluorobenzene (Surr)	133		35 - 150						

Lab Sample ID: 310-180277-1 MSD

Client Sample ID: GMW37  
 Prep Type: Total/NA

Matrix: Water

Analysis Batch: 277254

Analyte	Sample		Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Added	Result						
Benzene	<2.00		80.0	67.66		ug/L		85	47 - 120	6	33
Toluene	<2.00		80.0	67.60		ug/L		83	52 - 120	7	25
Ethylbenzene	3.56		80.0	69.81		ug/L		83	48 - 120	7	25
Xylenes, Total	16.1		240	216.3		ug/L		83	43 - 123	7	31
Surrogate	MSD		Limits								
	%Recovery	Qualifier									
4-Bromofluorobenzene (Surr)	118		35 - 150								

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: GeoTek Engineering & Testing Services  
 Project/Site: Vogels

Job ID: 310-180277-1  
 SDG: 91-400

## Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC) (Continued)

Lab Sample ID: MB 310-277397/4

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Matrix: Water

Analysis Batch: 277397

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	<2.00		2.00		ug/L			04/30/20 18:22	1
Toluene	<2.00		2.00		ug/L			04/30/20 18:22	1
Ethylbenzene	<2.00		2.00		ug/L			04/30/20 18:22	1
Xylenes, Total	<6.00		6.00		ug/L			04/30/20 18:22	1
Surrogate	MB MB		Limits				Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier							
4-Bromofluorobenzene (Surr)	101		35 - 150					04/30/20 18:22	1

Lab Sample ID: LCS 310-277397/5

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Matrix: Water

Analysis Batch: 277397

Analyte	Spike		LCS LCS		Unit	D	%Rec	Limits
	Added	Result	Result	Qualifier				
Benzene	40.0	40.64			ug/L		102	75 - 120
Toluene	40.0	40.10			ug/L		100	76 - 120
Ethylbenzene	40.0	41.37			ug/L		103	77 - 120
Xylenes, Total	120	124.1			ug/L		103	76 - 121
Surrogate	LCS LCS		Limits					
	%Recovery	Qualifier						
4-Bromofluorobenzene (Surr)	118		35 - 150					

Lab Sample ID: 310-180277-6 MS

Client Sample ID: GMW42  
 Prep Type: Total/NA

Matrix: Water

Analysis Batch: 277397

Analyte	Sample		Spike		MS MS		Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier	Unit				
Benzene	<2.00		40.0	36.92		ug/L		92	47 - 120	
Toluene	<2.00		40.0	36.95		ug/L		92	52 - 120	
Ethylbenzene	2.03		40.0	39.40		ug/L		93	48 - 120	
Xylenes, Total	8.73		120	121.3		ug/L		94	43 - 123	
Surrogate	MS MS		Limits							
	%Recovery	Qualifier								
4-Bromofluorobenzene (Surr)	120		35 - 150							

Lab Sample ID: 310-180277-6 MSD

Client Sample ID: GMW42  
 Prep Type: Total/NA

Matrix: Water

Analysis Batch: 277397

Analyte	Sample		Spike		MSD MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier	Unit						
Benzene	<2.00		40.0	33.07		ug/L		83	47 - 120	11	33	
Toluene	<2.00		40.0	32.57		ug/L		81	52 - 120	13	25	
Ethylbenzene	2.03		40.0	34.09		ug/L		80	48 - 120	14	25	
Xylenes, Total	8.73		120	105.1		ug/L		80	43 - 123	14	31	
Surrogate	MSD MSD		Limits									
	%Recovery	Qualifier										
4-Bromofluorobenzene (Surr)	111		35 - 150									

Eurofins TestAmerica, Cedar Falls

# QC Association Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

## GC VOA

Analysis Batch: 277254

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-180277-1	GMW37	Total/NA	Water	OA-1 (GC)	
310-180277-2	GMW36	Total/NA	Water	OA-1 (GC)	
310-180277-3	GMW35	Total/NA	Water	OA-1 (GC)	
310-180277-4	GMW41	Total/NA	Water	OA-1 (GC)	
310-180277-5	GMW38	Total/NA	Water	OA-1 (GC)	
MB 310-277254/5	Method Blank	Total/NA	Water	OA-1 (GC)	
LCS 310-277254/11	Lab Control Sample	Total/NA	Water	OA-1 (GC)	
310-180277-1 MS	GMW37	Total/NA	Water	OA-1 (GC)	
310-180277-1 MSD	GMW37	Total/NA	Water	OA-1 (GC)	

Analysis Batch: 277397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-180277-6	GMW42	Total/NA	Water	OA-1 (GC)	
310-180277-7	GMW39	Total/NA	Water	OA-1 (GC)	
310-180277-8	GMW30	Total/NA	Water	OA-1 (GC)	
310-180277-9	GMW25	Total/NA	Water	OA-1 (GC)	
310-180277-10	GMW40	Total/NA	Water	OA-1 (GC)	
310-180277-11	GMW44	Total/NA	Water	OA-1 (GC)	
310-180277-12	GMW19	Total/NA	Water	OA-1 (GC)	
MB 310-277397/4	Method Blank	Total/NA	Water	OA-1 (GC)	
LCS 310-277397/5	Lab Control Sample	Total/NA	Water	OA-1 (GC)	
310-180277-6 MS	GMW42	Total/NA	Water	OA-1 (GC)	
310-180277-6 MSD	GMW42	Total/NA	Water	OA-1 (GC)	

## Lab Chronicle

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID: GMW37**

Date Collected: 04/22/20 10:46  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-1**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277254	04/30/20 00:26	CMM	TAL CF

**Client Sample ID: GMW36**

Date Collected: 04/22/20 11:07  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-2**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277254	04/30/20 02:34	CMM	TAL CF

**Client Sample ID: GMW35**

Date Collected: 04/22/20 11:27  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-3**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277254	04/30/20 03:06	CMM	TAL CF

**Client Sample ID: GMW41**

Date Collected: 04/22/20 11:50  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-4**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277254	04/30/20 03:38	CMM	TAL CF

**Client Sample ID: GMW38**

Date Collected: 04/22/20 12:10  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-5**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277254	04/30/20 04:09	CMM	TAL CF

**Client Sample ID: GMW42**

Date Collected: 04/22/20 12:35  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-6**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277397	04/30/20 20:29	CMM	TAL CF

**Client Sample ID: GMW39**

Date Collected: 04/22/20 12:55  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-7**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277397	04/30/20 21:00	CMM	TAL CF

Eurofins TestAmerica, Cedar Falls

## Lab Chronicle

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

**Client Sample ID: GMW30**  
Date Collected: 04/22/20 13:15  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-8**  
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277397	04/30/20 21:32	CMM	TAL CF

**Client Sample ID: GMW25**  
Date Collected: 04/22/20 13:45  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-9**  
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277397	04/30/20 22:03	CMM	TAL CF

**Client Sample ID: GMW40**  
Date Collected: 04/22/20 14:08  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-10**  
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277397	04/30/20 22:35	CMM	TAL CF

**Client Sample ID: GMW44**  
Date Collected: 04/22/20 14:28  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-11**  
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277397	04/30/20 23:06	CMM	TAL CF

**Client Sample ID: GMW19**  
Date Collected: 04/22/20 14:45  
Date Received: 04/23/20 09:40

**Lab Sample ID: 310-180277-12**  
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	277397	04/30/20 23:38	CMM	TAL CF

### Laboratory References:

TAL CF = Eurofins TestAmerica, Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Eurofins TestAmerica, Cedar Falls

## Accreditation/Certification Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

### Laboratory: Eurofins TestAmerica, Cedar Falls

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
AIHA-LAP, LLC	Industrial Hygiene Laboratory	101044	11-01-20
Colorado	Accreditation Program (IHLAP)	IA100001 (OR)	09-29-20
Georgia	Petroleum Storage Tank Program	IA100001 (OR)	09-29-20
Illinois	State	200024	11-29-20
Iowa	NELAP	007	12-01-21
Kansas	State	E-10341	01-31-21
Minnesota	NELAP	019-999-319	12-31-20
Minnesota (Petrofund)	State	3349	08-22-21
North Dakota	NELAP	R-186	09-30-20
Oregon	US Federal Programs	IA100001	09-29-20
USDA		P330-19-00003	01-02-22

## Method Summary

Client: GeoTek Engineering & Testing Services  
Project/Site: Vogels

Job ID: 310-180277-1  
SDG: 91-400

Method	Method Description	Protocol	Laboratory
OA-1 (GC)	Volatile Petroleum Hydrocarbons (GC)	Iowa DNR	TAL CF
5030B	Purge and Trap	SW846	TAL CF

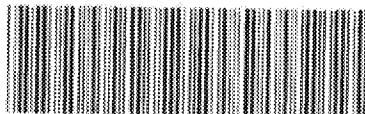
**Protocol References:**

Iowa DNR = Iowa Department of Natural Resources

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL CF = Eurofins TestAmerica, Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Environment Testing  
TestAmerica

310-180277 Chain of Custody

## Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: Geotek Engineering & Testing Service			
City/State: Sioux Falls	SD		
Project: Vogel's			
Receipt Information			
Date/Time Received:	4/23/20 0940	Received By:	EAM
Delivery Type:	<input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? _____
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice	<input type="checkbox"/> Blue ice	<input type="checkbox"/> Dry ice
<input type="checkbox"/> Other: _____	<input type="checkbox"/> NONE		
Thermometer ID:	Gen M		Correction Factor (°C): +0.1
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	+0.3	Corrected Temp (°C):	+0.4
• Sample Container Temperature			
Container(s) used:	CONTAINER 1		CONTAINER 2
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			
_____			
_____			
_____			

## Chain of Custody Record

 eurofins Environmental Testing Services

TestAmerica Laboratories, Inc. dba Eurofins TestAmerica

Regulatory Program:  On  News  RCRA  Other:

Project Manager: Kathy Velasco

Email: kvelasco@eurofins.com

Tel/Fax: (319) 277-2401

Analysis Turnaround Time

CALENDAR DAYS  WORKING DAYS

TA/TI Different from Below: \_\_\_\_\_

2 weeks

1 week

2 days

1 day

Other: \_\_\_\_\_

Sample Identification

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Type  
(C-Samp  
S-Omn)

Matrix

# of Cont.

Sample

Sample Date

Sample Time

Performer MS / Lab ID: GMW144

Date/Time: 4/16/2020 4:30 PM

Received by: None

Date/Time: 4/16/2020 4:30 PM

Comments: None

Return to Client:

Archive for Months:

Custody Seal Intact:  Yes  No

Custody Seal No.: GMW144

Company: Geotek

Date/Time: 4/16/2020 4:30 PM

Received by: None

Date/Time: 4/16/2020 4:30 PM

Comments: None

Return to Client:

Archive for Months:

Custody Seal Intact:  Yes  No

Custody Seal No.: GMW144

Company: Geotek

Date/Time: 4/16/2020 4:30 PM

Received by: None

Date/Time: 4/16/2020 4:30 PM

Comments: None

Return to Client:

Archive for Months:

Custody Seal Intact:  Yes  No

Custody Seal No.: GMW144

Company: Geotek

Date/Time: 4/16/2020 4:30 PM

Received by: <

## Login Sample Receipt Checklist

Client: GeoTek Engineering & Testing Services

Job Number: 310-180277-1

SDG Number: 91-400

**Login Number:** 180277

**List Source:** Eurofins TestAmerica, Cedar Falls

**List Number:** 1

**Creator:** Bindert, Lindsay A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## **APPENDIX C**

Prepared for  
**United States Environmental Protection Agency Region 7**  
**11201 Renner Blvd.**  
**Lexana, Kansas**

and

**Iowa Department of Natural Resources**  
**Wallace State Office Building**  
**502 East 9<sup>th</sup> Street, 4<sup>th</sup> Floor**  
**Des Moines, Iowa**

On behalf of  
**Vogel Paint and Wax Company**  
**109 3<sup>rd</sup> St NW**  
**Orange City, Iowa**

Prepared by  
**Ramboll US Corporation**  
**Irvine, California**

Project Number  
**1690001847-008**

Date  
**July 30, 2020**

# **POST-INJECTION MONITORING REPORT**

## **VOGEL PAINT & WAX CO.**

## **GRANT AVENUE BETWEEN 490<sup>TH</sup> AND 500<sup>TH</sup> STREET**

## **MAURICE, IOWA**



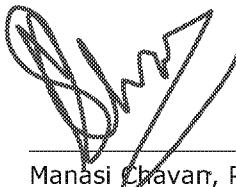
Post-Injection Monitoring Report

Vogel Paint and Wax Co.

Maurice, Iowa

i

PREPARED BY



Manasi Chavan, PE  
Senior Consultant



Eric Smith, PG, CHG  
Principal



David K. Liu, PhD  
Principal

P:\V\Verdant Law\0436011H Vogel Paint Maurice IA\Pilot Study\Post Injection Monitoring Reports\Post Injection Monitoring Report - 7-30-20.docx

**Ramboll US Corporation**  
**5 Park Place, Suite 500**  
**Irvine, CA 92614**  
**T +1 949 261 5151**  
**F +1 949 261 6202**

## CONTENTS

	Page
<b>1. INTRODUCTION AND BACKGROUND</b>	<b>1</b>
<b>2. IN-SITU BIOREMEDIALATION PILOT STUDY</b>	<b>2</b>
<b>3. POST-INJECTION GROUNDWATER MONITORING AND REDEVELOPMENT ACTIVITIES</b>	<b>3</b>
3.1 Groundwater Monitoring Activities	3
3.2 Redevelopment Activities	3
<b>4. POST-INJECTION GROUNDWATER MONITORING RESULTS</b>	<b>1</b>
4.1 Results of Benzene, Toluene, Ethylbenzene, and Xylenes Analyses	1
4.2 Results of Nutrient Analyses	1
4.2.1 Total Kjeldahl Nitrogen	1
4.2.2 Nitrate/Nitrite as N	2
4.2.3 Total Phosphorous as P	2
4.3 Results of Microbial Data	2
4.3.1 Phenol Hydroxylase	2
4.3.2 Ethylbenzene Dioxygenase	2
4.3.3 Total Eurobacteria	2
4.4 Results of Geophysical Parameters	2
4.4.1 Water Level	2
4.4.2 Temperature	3
4.4.3 Conductivity	3
4.4.4 Total Dissolved Solids	3
4.4.5 Dissolved Oxygen	3
4.4.6 pH	3
4.4.7 Oxidation-Reduction Potential	3
<b>5. CONCLUSIONS</b>	<b>4</b>
<b>6. ADDITIONAL CHARACTERIZATION AT THE FORMER SOURCE AREA</b>	<b>5</b>
6.1 Data Evaluation and Report Preparation	5
<b>7. LIMITATIONS</b>	<b>6</b>
<b>8. REFERENCES</b>	<b>7</b>

## TABLES

- Table 1: Groundwater Analytical Data – BTEX  
Table 2: Groundwater Analytical Data – Nutrients  
Table 3: Groundwater Analytical Data – Microbial  
Table 4: Groundwater Parameter Data

## FIGURES

Figure 1: Remedial Layout

Figure 2: Proposed Groundwater Sample Locations – Former Source Area

## APPENDICES

Appendix A: Laboratory Analytical Results Reports

## 1. INTRODUCTION AND BACKGROUND

Ramboll U.S. Corporation (Ramboll), on behalf of Vogel Paint and Wax Company (Vogel), has prepared this Post-Injection Monitoring Event Report ("Injection Report") for the property located on Grant Avenue Between 490th and 500th street in the City of Maurice, Sioux County, Iowa ("the Site").

The United States Environmental Protection Agency – Region 7 (USEPA) requested that Vogel provide and implement a plan to further evaluate the on- and off-Site groundwater plume. A Pilot Study Work Plan (PSWP) was submitted to the USEPA on May 24, 2019 (Ramboll, 2019) that presents an approach for in-situ bioremediation to evaluate the enhancement of groundwater remediation at the Site. The details for the execution of the Pilot Study was presented in Pilot Study Design Plan Addendum for Enhancement of Groundwater Remediation (Addendum to the PSWP) submitted to USEPA and the Iowa Department of Natural Resources (IDNR) on October 7, 2019 (Ramboll, 2019a).

## 2. IN-SITU BIOREMEDIATION PILOT STUDY

In December 2017, Ramboll conducted a bioremediation feasibility study at the Site and determined that conditions in the water-bearing zone are conducive to bioremediation, although the addition of oxygen and nutrient amendments, as well as potentially microbial augmentation, are likely required. Based on the results of the Bio-Trap® study (presented in the Addendum to the PSWP), a slow-release oxygen product (calcium peroxide/EoX) and diammonium phosphate (DAP) were selected to be the materials to be injected to promote the most effective stimulus for the native microbial population and to sustain those expanded microbial populations for an extended period of time during degradation of the contaminants of concern (COCs). PlumeStop® was selected to provide a barrier for off-Site migration of the contaminants. EoX and DAP injection adjacent and upgradient to the PlumeStop® barrier will allow for the degradation of the contaminants sequestered by PlumeStop®.

Injections of EoX and DAP were conducted via 83 injection points with an injection depth interval of 10 feet (14-24 feet below ground surface [bgs]) in a grid application over the approximate 20,000-square-foot Former Source Area.

As in the Former Source Area, the downgradient and off-Site portion of the plume received strategically-placed injections of EoX and DAP, creating permeable reactive barriers (PRBs). Five total PRBs were installed, three in the downgradient on-Site area and two in the off-Site area (Figure 1).

Additionally, to provide longer term control of possible off-Site migration of residual contaminant concentrations, the application of a sorption-based technology (PlumeStop® developed by Regenesis® Remediation Solutions and Products [RRS]) was installed along the downgradient property boundary. PlumeStop® was injection at 44 injection points along a 200 feet long barrier and the injection depth interval/thickness was 41-44 feet bgs to 50-53 feet bgs (thickness of 9-11 feet).

The injection event at the Site began on October 8, 2019 and was completed on November 9, 2019. Addition details of the injection activities are provided in Ramboll's Injection Event and Post-Injection Monitoring Report dated February 10, 2020 (Ramboll, 2020).

### **3. POST-INJECTION GROUNDWATER MONITORING AND REDEVELOPMENT ACTIVITIES**

#### **3.1 Groundwater Monitoring Activities**

In addition to the existing groundwater sampling program, seven wells located within the plume area were selected to be sampled and analyzed to evaluate the effectiveness of the Pilot Study actions at 1, 3, 6, 9, and 12 months following the injection of the bioremediation materials. The wells selected are located immediately downgradient of the reactive bioremediation zones, along with wells located in the Former Source Area that currently have the highest concentrations of chemicals of concern (COCs) within the plume. The following seven wells were monitored to establish baseline conditions and to further evaluate the progress of the bioremediation activities, following implementation of the injection program: GMW-13, GMW-14, GMW-10R, GMW-11, GMW-15, GMW-7R and GMW-21 (see Figure 1).

The above-referenced seven monitoring wells were sounded for depth-to-water levels, sampled via low-flow purging/sampling methodology, and analyzed for the following:

<b>Constituent</b>	<b>Method Number</b>
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)	8260B (USEPA)
Total Kjeldahl Nitrogen (TKN)	351.2 (USEPA)
Nitrate/Nitrite as N	353.2 (USEPA)
Total Phosphorous	365.3 (USEPA)
Total Eubacteria (EBAC)	CENSUS (qPCR)
Phenol Hydroxylase (PHE)	CENSUS (qPCR)
Ethylbenzene Dioxygenase (EDO)	CENSUS (qPCR)

Based on prior 2017 results presented in the PSWP, functional genes PHE and EDO were selected as key COC degradation indicators to be monitored to evaluate bioremediation effectiveness. EBAC is also measured to assess changes in total bacterial population.

Prior to purging the monitoring wells, water levels were measured from the top of the well casing, to the nearest 0.01 foot, using a Solinst Water level probe, and recorded. During the low-flow purging, groundwater was monitored for temperature, specific conductivity, total dissolved solids (TDS), dissolved oxygen (DO), pH, and oxidation-reduction potential (ORP) in each well with a down-well YSI probe.

#### **3.2 Redevelopment Activities**

Based on an assessment of prior parameter readings and analytical results (pH and microbial data), it was Ramboll's opinion that EOx may have precipitated at the bottom of Well GMW-14 causing higher pH levels and lower microbial population. In order to confirm this, on March 18, 2020, water was bailed out from the bottom of this well and some milky material was noted in the bailed water. Water was continued to be bailed out and after bailing out approximately 15 to 20 gallons of water from the bottom of GMW-14, water was noted to be clearer, but still appeared to be a little cloudy. Approximately, 3.5 gallons (about 3 casing volumes) of fresh water was then added to GMW-14 and the well was left idle for

Post-Injection Monitoring Report

Vogel Paint and Wax Co.

Maurice, Iowa

4

approximately 20 minutes, after which about 10 gallons of water was bailed out from GMW-14. Additionally, on April 17, 2020, water was bailed twice from GMW-14, removing a total of approximately 10 gallons of water.

## 4. POST-INJECTION GROUNDWATER MONITORING RESULTS

On October 3, 2019, a baseline groundwater sampling event of the above referenced seven monitoring wells was conducted, prior to the initiation of the injection activities. The initial (1-month), 3-month, and 6-month time period post-injection groundwater monitoring events were conducted at the Site on December 12, 2019, February 10, 2020 and May 11, 2020, respectively.

A general presentation of the baseline and the 6-month post-injection groundwater monitoring events is presented below. Sampling showed a range of results (with both increases and decreases in concentrations for various constituents and parameters) in individual wells that were measured during the baseline and the 6-month post-injection monitoring event. The baseline, initial (1-month), 3-month, and 6-month post-injection groundwater sampling results are summarized in Tables 1 through 4. The laboratory analytical results reports are included in Appendix A.

### 4.1 Results of Benzene, Toluene, Ethylbenzene, and Xylenes Analyses

- The 6-month post-injection groundwater samples contained benzene concentrations ranging from ND to 33 microgram per liter ( $\mu\text{g}/\text{L}$ ) in GMW-14. The 6-month post-injection benzene concentrations have generally decreased (or continued to be ND) compared to the baseline monitoring results, with the exception of GMW-10R, where the benzene concentration increased from 0.59  $\mu\text{g}/\text{L}$  to 10  $\mu\text{g}/\text{L}$ .
- The 6-month post-injection groundwater samples contained toluene concentrations ranging of ND to 8,900  $\mu\text{g}/\text{L}$  (GMW-14). The 6-month post-injection toluene concentrations were noted to decrease (or continued to be ND) compared to the baseline monitoring results, with the exception of GMW-10R, where the toluene concentration increased from 2.0  $\mu\text{g}/\text{L}$  to 58  $\mu\text{g}/\text{L}$ .
- The 6-month post-injection groundwater samples contained ethylbenzene concentrations ranging of ND to 17,000  $\mu\text{g}/\text{L}$  (GMW-13). The 6-month post-injection ethylbenzene concentrations were noted to decrease (or continued to be ND) compared to the baseline monitoring results, with the exception of GMW-10R, where the ethylbenzene concentration increased from 790  $\mu\text{g}/\text{L}$  to 6,400  $\mu\text{g}/\text{L}$ .
- The 6-month post-injection groundwater samples contained xylenes concentrations ranging of ND to 87,000  $\mu\text{g}/\text{L}$  (GMW-14). The 6-month post-injection xylene concentrations were noted to decrease (or continued to be ND) compared to the baseline monitoring results, with the exception of GMW-10R, where the xylenes concentration increased from 2,000  $\mu\text{g}/\text{L}$  to 26,000  $\mu\text{g}/\text{L}$ .

### 4.2 Results of Nutrient Analyses

#### 4.2.1 Total Kjeldahl Nitrogen

Nitrogen is a nutrient that aids in sustaining the microbial population as it blooms for the injection of EO<sub>x</sub>. It is expected that the post injection TKN concentrations increase initially and then gradually decrease over time as it gets consumed. The 6-month post-injection groundwater samples contained TKN concentrations ranging from ND to 2.1 milligram per liter (mg/L) in GMW-14. The 6-month post-injection TKN concentrations had decreased or remained relatively constant in six wells (GMW-7R, GMW-10R, GMW-11, GMW-14, GMW-15,

GMW-21) and had increased in one well (GMW-13) compared to the baseline monitoring results.

#### **4.2.2 Nitrate/Nitrite as N**

Nitrate is an alternate electron acceptor for microbial respiration in the absence of oxygen. It is expected that the post injection nitrate concentrations increase initially and then gradually decrease over time as it gets consumed. The 6-month post-injection groundwater samples contained nitrate/nitrite concentrations ranging from ND to 21 mg/L (GMW-11). The 6-month post-injection nitrate/nitrite concentrations had decreased or remained relatively constant in four wells (GMW-7R, GMW-10R, GMW-13, GMW-14) and had increased in three wells (GMW-11, GMW-15, GMW-21) compared to the baseline monitoring results.

#### **4.2.3 Total Phosphorous as P**

Phosphorous is a nutrient that aids in sustaining the microbial population as it blooms for the injection of EO<sub>x</sub>. It is expected that the post injection phosphorous concentrations increase initially and then gradually decrease over time as it gets consumed. The 6-month post-injection groundwater samples contained total phosphorous concentrations ranging from ND to 0.46 mg/L (GMW-7R). The 6-month post-injection total phosphorous concentrations had decreased in five wells (GMW-11, GMW-13, GMW-14, GMW-15, GMW-21) and had increased in two wells (GMW-7R and GMW-10R) compared to the baseline monitoring results.

### **4.3 Results of Microbial Data**

#### **4.3.1 Phenol Hydroxylase**

The 6-month post-injection groundwater samples contain PHE concentrations ranging from 50.2 cells per milliliter (cells/mL) in GMW-11 to 30,500 cells/mL (GMW-7R). The 6-month post-injection PHE concentrations had increased in three wells (GMW-7R, GMW-15, GMW-21) and had decreased in four wells (GMW-10R, GMW-11, GMW-13, GMW-14) compared to the baseline monitoring results.

#### **4.3.2 Ethylbenzene Dioxygenase**

The 6-month post-injection groundwater samples contained EDO concentrations ranging from <4.7 cells/mL (GMW-10R, GMW-11) to 53,300 cells/mL (GMW-14). The 6-month post-injection EDO concentrations had increased in two wells (GMW-15, GMW-21) and had decreased in five wells (GMW-7R, GMW-10R, GMW-11, GMW-13, GMW-14) compared to the baseline monitoring results.

#### **4.3.3 Total Eurobacteria**

The 6-month post-injection groundwater samples contain EBAC concentrations ranging from 32,200 cells/mL (GMW-11) to 10,500,000 cells/mL (GMW-14). The 6-month post-injection EBAC concentrations had increased in three wells (GMW-10R, GMW-15, GMW-21) and had decreased in four wells (GMW-7R, GMW-11, GMW-13, GMW-14) compared to the baseline monitoring results.

### **4.4 Results of Geophysical Parameters**

#### **4.4.1 Water Level**

The 6-month post-injection depth-to-water readings ranged from 13.99 feet below top of riser (btor) in GMW-14 to 41.49 feet btor in GMW-21. The 6-month post-injection depth-to-water readings in all seven wells had increased compared to the baseline

monitoring results; therefore, groundwater elevation decreased in all seven wells ranging from 1280.69 feet (GMW-21) to 1283.22 feet (GMW-10R) compared to the baseline monitoring results. The decreases in groundwater elevation ranged from 0.24 foot (GMW-10R) to 1.32 feet (GMW-13).

#### **4.4.2 Temperature**

The 6-month time period post-injection temperature readings ranged from 9.4 degree Celsius ( $^{\circ}\text{C}$ ) in GMW-14 to 12.6 $^{\circ}\text{C}$  in GMW-15. The 6-month post-injection groundwater temperature increased in five wells (GMW-7R, GMW-10R, GMW-11, GMW-15, GMW-21) and decreased in two wells (GMW-13, GMW-14) compared to the baseline monitoring results.

#### **4.4.3 Conductivity**

The 6-month post-injection conductivity readings ranged from 537 millisiemens per centimeter (mS/cm) in GMW-14 to 890 mS/cm in GMW-13. The 6-month post-injection conductivity readings had decreased in all seven wells compared to the baseline monitoring results.

#### **4.4.4 Total Dissolved Solids**

The 6-month post-injection TDS readings ranged from 349 mg/L in GMW-14 to 578 mg/L in GMW-13. The 6-month post-injection TDS readings had decreased in all seven wells compared to the baseline monitoring results.

#### **4.4.5 Dissolved Oxygen**

The 6-month post-injection DO readings ranged from 0.03 mg/L in GMW-7R to 17.8 mg/L in GMW-14. The 6-month post-injection DO readings had increased in two wells (GMW-11, GMW-14) with a significant increase noted in GMW-14 (1.77 mg/L to 17.8 mg/L) and had decreased in five wells (GMW-7R, GMW-10R, GMW-13, GMW-15, GMW-21) compared to the baseline monitoring results.

#### **4.4.6 pH**

The 6-month post-injection pH readings ranged from 7.06 in GMW-10R and GMW-13 to 9.27 in GMW-14. The 6-month post-injection pH readings had increased in six wells (GMW-7R, GMW-10R, GMW-11, GMW-14, GMW-15, GMW-21) and had decreased in one well (GMW-13) compared to the baseline monitoring results.

#### **4.4.7 Oxidation-Reduction Potential**

The 6-month post-injection ORP readings ranged from -237 mV in GMW-7R to 218 in GMW-11. The 6-month post-injection ORP readings had increased in two wells (GMW-11, GMW-14) and had decreased in five wells (GMW-7R, GMW-10R, GMW-13, GMW-15, GMW-21) compared to the baseline monitoring results.

## 5. CONCLUSIONS

Existing groundwater monitoring wells are currently sampled on a semi-annual basis for BTEX compounds and monitored natural attenuation parameters. Additionally, seven selected wells located within the plume area will continue to be sampled and analyzed on a quarterly basis during 2020 (at 9- and 12-month time periods after the injection) to evaluate the effectiveness of the Pilot Study actions. All groundwater monitoring data are presented in semi-annual monitoring reports prepared by GeoTek Engineering and Testing Services and Ramboll.

The additional planned monitoring events at the 9- and 12-month time periods after the injection will be used to continue to assess trends and evaluate the effectiveness of the Pilot Study.

Post-injection concentrations of ethylbenzene and xylenes in Wells GMW-7R and GMW-20 directly downgradient from the PlumeStop® injection points/PRBs continue to be ND or low, which represent significant decreases in concentrations of these constituents. Additionally, off-Site Well GMW-21 located further downgradient from the PlumeStop® injection points/PRBs, shows a significant post-injection decrease in the concentrations of ethylbenzene and xylenes. Both at the property line and off-site select well locations, BTEX concentrations have decreased below the maximum contaminant levels for drinking water (MCLs) set as the applicable or relevant and appropriate requirements (ARARs) for groundwater at the defined point of compliance at the property boundary. Based on these results, PlumeStop® has been effective at preventing migration of contaminants across the barrier and effectively creating a "clean" zone immediately downgradient of the barrier. Future monitoring results will be used to confirm and monitor these results.

Post-injection concentrations of BTEX in the Former Source Area Wells GMW-13 and GMW-14 have generally decreased steadily, with significant decreases in toluene concentrations; however, BTEX concentrations remain elevated in these wells.

Post-injection concentrations of ethylbenzene and xylene in Well GMW-10R have significantly increased. This increase may be the result of displacement of impacted groundwater in the vicinity of GWM-10R during injection activities. Further monitoring will be conducted at GMW-10R before determining whether any additional activities may be conducted in the vicinity of this well.

Ramboll is proposing to conduct additional characterization in the Former Source Area to further evaluate groundwater conditions in this area near and between Wells GMW-13 and GMW-14. In particular, Ramboll will evaluate whether GMW-14 may have been compromised due to injected materials potentially having precipitated in the well and screen interval filter material (Section 3.2), and if so, whether the well should be replaced or supplemented with an additional well to further monitor the effectiveness of the *in-situ* bioremediation Pilot Study activities.

## 6. ADDITIONAL CHARACTERIZATION AT THE FORMER SOURCE AREA

Based on concerns that Well GMW-14 may be compromised as indicated above, additional groundwater sampling is proposed near GMW-14 to determine if BTEX concentrations in GMW-14 are representative of groundwater conditions at this well location or affected by possible precipitated injected materials are hung-up in the well construction materials. Additional groundwater sampling points are also proposed at locations between Wells GMW-13 and GMW-14 to get a better understanding of the groundwater conditions in the grid injection area within the Former Source Area.

Four temporary groundwater sampling points will be completed by Ramboll with support from GeoTek, in the Former Source Area, (see Figure 2). Borings will be drilled to a depth of 24 feet and 10-foot long, 2-inch diameter temporary well casings will be placed in the boreholes. The temporary well screens will be placed at a depth interval of 14 – 24 feet bgs to match the injection depths completed in the former sources area in October 2019. Water levels in the temporary well casing will be monitored to confirm static groundwater levels have equilibrated prior to collecting groundwater samples at each location.

Prior to the collection of groundwater samples, the groundwater will be monitored for field parameters, including temperature, pH, DO, ORP, and specific conductance. Field parameters will be recorded on field purging and sampling logs. Disposable bailers will be used to collect grab groundwater samples from the temporary well casings. The groundwater samples will be collected into laboratory-supplied glassware, placed in a closed, cooled container, and delivered to an Iowa state-certified laboratory under standard chain-of-custody protocol. The microbial analysis samples are delivered to Microbial Insights located in Tennessee.

The groundwater samples will be analyzed for the same constituents listed in Section 3.1 of this report. One field duplicate sample and one trip blank will be submitted for BTEX analysis only. Groundwater samples will be analyzed on a normal turnaround basis (10-days).

The proposed grab groundwater sampling is anticipated to be conducted in August 2020 to correspond with the planned 9-month post-injection groundwater sampling event of the select set of seven groundwater monitoring wells.

### 6.1 Data Evaluation and Report Preparation

Upon completion of the groundwater sampling and analyses, the analytical data will be evaluated and incorporated into a letter report and submitted to EPA and IDNR. Based on the results, recommendations and scope of work will be presented for potential replacement of, or supplement to, Well GMW-14 to further monitor groundwater conditions in the Former Source Area within the pilot study injection area.

## 7. LIMITATIONS

This Report has been prepared for the exclusive use of Vogel Paint and Wax Company and, aside from environmental regulatory agencies, may not be relied upon by any other person or entity without Ramboll's prior express written permission.

This report has been prepared in conformance with generally accepted standards of practice in the fields of environmental sciences and engineering at the time the services were rendered. Ramboll makes no other warranty or representation, either express or implied, with respect to its services.

The report was developed based in part on information/data provided by our client and/or other third parties and conditions identified as of the date of this report. Ramboll assumes that such provided information is accurate.

## 8. REFERENCES

- Ramboll. 2019. Pilot Study Work Plan for Enhancement of Groundwater Remediation, Vogel Paint & Wax Co. Grant Avenue Between 490th And 500th Street, Maurice, Iowa. May 24.
- Ramboll. 2019a. Pilot Study Work Plan Addendum for Enhancement of Groundwater Remediation, Vogel Paint & Wax Co. Grant Avenue Between 490th And 500th Street, Maurice, Iowa. October 7.
- Ramboll. 2020. Injection Event and Post-Injection Monitoring Report, Vogel Paint & Wax Co. Grant Avenue Between 490th And 500th Street, Maurice, Iowa. February 10.

Post-Injection Monitoring Report  
Vogel Paint and Wax Co.  
Maurice, Iowa

**TABLES**

**Table 1. Groundwater Analytical Data - BTEX**

Vogel Paint Wax Co.

Maurice, Iowa

Well ID	Date	BTEX (µg/L)			
		Benzene	Toluene	Ethylbenzene	Xylenes (total)
USEPA MCL		<b>5.00</b>	<b>1,000</b>	<b>700</b>	<b>10,000</b>
GMW-7R	10/3/2019	1.3	<1.0	<b>820</b>	4,300
	12/12/2019	<0.50	<1.0	<1.0	<3.0
	2/10/2020	<0.50	<1.0	<1.0	<3.0
	5/11/2020	<0.50	<1.0	2.8	4.5
GMW-10R	10/3/2019	0.59	2.0	<b>790</b>	2,000
	12/12/2019	1.2	16	<b>1,400</b>	5,500
	2/10/2020	<b>6.8</b>	440	<b>6,100</b>	<b>28,000</b>
	5/11/2020	<b>10</b>	58	<b>6,400</b>	<b>26,000</b>
GMW-11	10/3/2019	<0.50	<1.0	<1.0	<3.0
	12/12/2019	1.2	16	<b>1,400</b>	5,500
	2/10/2020	<0.50	<1.0	2.0	4.1
	5/11/2020	<0.50	<1.0	<1.0	<3.0
GMW-13	10/3/2019	<b>14</b>	<b>19,000</b>	<b>23,000</b>	<b>90,000</b>
	12/12/2019	<b>7.1</b>	<b>12,000</b>	<b>18,000</b>	<b>87,000</b>
	2/10/2020	<b>6.7</b>	<b>9,900</b>	<b>16,000</b>	<b>77,000</b>
	5/11/2020	<b>6.2</b>	<b>7,900</b>	<b>17,000</b>	<b>87,000</b>
GMW-14	10/3/2019	<b>51</b>	<b>17,000</b>	<b>15,000</b>	<b>87,000</b>
	12/12/2019	<b>29</b>	<b>13,000</b>	<b>13,000</b>	<b>91,000</b>
	2/10/2020	<b>36</b>	<b>14,000</b>	<b>12,000</b>	<b>93,000</b>
	3/18/2020	<b>59</b>	<b>16,000</b>	<b>14,000</b>	<b>95,000</b>
	5/11/2020	<b>33</b>	<b>8,900</b>	<b>11,000</b>	<b>79,000</b>
GMW-15	10/3/2019	<0.50	<1.0	120	830
	12/12/2019	<0.50	8.1	97	540
	2/10/2020	<0.50	<1.0	8.6	67
	5/11/2020	<0.50	<1.0	2.7	57
GMW-21	10/3/2019	3.1	<1.0	<b>1,700</b>	4,900
	12/12/2019	2.2	4.9	<b>1,300</b>	4,100
	2/10/2020	1.5	<1.0	<b>700</b>	2,000
	5/11/2020	<5.0	<10	170	680

Notes:

BTEX - benzene, toluene, ethylbenzene, and xylenes

ID - identification

MCL - Maximum Contaminant Level for drinking water

µg/L - microgram per liter

mg/L - milligram per liter

USEPA - United States Environmental Protection Agency

**Bold results** - Concentrations above MCLs

&lt; - not detected

10/3/2019 results: Baseline (pre-injection)

12/12/2019 through 5/11/2020 - post-injection

**Table 2. Groundwater Analytical Data - Nutrients**

Vogel Paint Wax Co.

Maurice, Iowa

Well ID	Date	Nutrients (mg/L)		
		Total Kjeldahl Nitrogen	Nitrate/Nitrite as N	Total Phosphorous as P
GMW-7R	10/3/2019	<1.0	<0.10	0.11
	12/12/2019	<1.0	<0.10	2.7
	2/10/2020	<1.0	2.3	0.72
	5/11/2020	<1.0	<0.10	0.46
GMW-10R	10/3/2019	2.0	<0.10	0.26
	12/12/2019	<1.0	<0.10	<0.10F1
	2/10/2020	<1.0	<0.10	0.11
	5/11/2020	<1.0	<0.10	0.33
GMW-11	10/3/2019	<1.0	18	0.19
	12/12/2019	3.1	21	<0.10
	2/10/2020	<1.0	21	<0.10
	5/11/2020	<1.0	21	<0.10
GMW-13	10/3/2019	<1.0	<0.10	0.16
	12/12/2019	1.4	<0.10	0.12
	2/10/2020	1.4	<0.10	0.11
	5/11/2020	1.6	<0.10	0.15
GMW-14	10/3/2019	5.0	<0.10	0.23
	12/12/2019	5.8	<0.10	2.1
	2/10/2020	4.4	<0.10	1.0
	5/11/2020	2.1	<0.10	0.1
GMW-15	10/3/2019	3.3	0.41F1	0.24
	12/12/2019	<1.0	0.59	<0.10
	2/10/2020	<1.0	1.3	0.11
	5/11/2020	<1.0	1.4	<0.10
GMW-21	10/3/2019	<1.0	1.3	0.11
	12/12/2019	<1.0	0.42	<0.10
	2/10/2020	<1.0	0.53	<0.10
	5/11/2020	<1.0	1.4	<0.10

Notes:

ID - identification

mg/L - milligram per liter

F1 - Matric Spike and/or Matric Spike Duplicate Recovery is outside acceptance limits

&lt; - not detected

10/3/2019 results: Baseline (pre-injection)

12/12/2019 through 5/11/2020 - post-injection

**Table 3. Groundwater Analytical Data - Microbial**

Vogel Paint Wax Co.

Maurice, Iowa

Well ID	Date	Phenol Hydroxylase	Ethylbenzene dioxygenase	Total Eubacteria
		(cells/mL)		
GMW-7R	10/3/2019	3,550	5,120	7,010,000
	12/12/2019	17,000	32	2,630,000
	2/11/2020	89,500	<4.0	2,980,000
	5/11/2020	30,500	<4.8	1,860,000
GMW-10R	10/3/2019	490,000	802	19,400
	12/12/2019	24,400	19.8	5,620,000
	2/11/2020	41,900	<4.8	4,600,000
	5/11/2020	3,270	<4.7	443,000
GMW-11	10/3/2019	1,360	<4.9	983,000
	12/12/2019	28.8	9.8	118,000
	2/11/2020	1,940	<4.6	579,000
	5/11/2020	50.2	<4.7	32,200
GMW-13	10/3/2019	674,000	20,000	69,400,000
	12/12/2019	65,400	5,120	31,500,000
	2/11/2020	28,800	7,350	22,200,000
	5/11/2020	15,000	4,360	4,660,000
GMW-14	10/3/2019	400,000	129,000	109,000,000
	12/12/2019	19.2J	1.3J	13,000
	2/11/2020	<25	<25	1,480
	5/11/2020	5,340	53,300	10,500,000
GMW-15	10/3/2019	298	<4.70	1,590,000
	12/12/2019	6,000	72.2	5,240,000
	2/11/2020	14,200	1,630	5,430,000
	5/11/2020	497	342	1,810,000
GMW-21	10/3/2019	19,900	1,170	5,710,000
	12/12/2019	30,000	755	7,670,000
	2/11/2020	234,000	3,510	35,700,000
	5/12/2020	29,100	1,220	6,730,000

**Notes:**

cells/mL - cells per milliliter

ID - identification

&lt; - not detected

J - Estimated gene copies below practical quantitation limit but above lower quantitation limit

10/3/2019 results: Baseline (pre-injection)

12/12/2019 through 5/11/2020 - post-injection

**Table 4. Groundwater Parameter Data**

Vogel Paint Wax Co.  
Maurice, Iowa

<b>Well ID</b>	<b>Date</b>	<b>Water Level (ft TOR)</b>	<b>TOR Elevation</b>	<b>Water Elevation (ft)</b>	<b>Temperature (°C)</b>	<b>Conductivity (mS/cm)</b>	<b>TDS (mg/L)</b>	<b>DO (mg/L)</b>	<b>pH</b>	<b>ORP (mV)</b>
GMW-7R	10/3/2019	34.96	1317.58	1282.62	9.74	794	516	1.81	7.22	-93
	12/12/2019	35.41		1282.17	10.54	808	516	0.65	7.19	-36
	2/10/2020	36.34		1281.24	10.90	810	517	1.41	7.05	-68
	5/11/2020	36.71		1280.87	11.50	770	501	0.03	7.28	-237
GMW-10R	10/3/2019	18.31	1303.37	1285.06	10.32	946	615	3.30	6.90	152
	12/12/2019	18.55		1284.82	10.02	998	635	2.31	6.80	112
	2/10/2020	20.12		1283.25	11.04	920	588	2.28	6.83	81
	5/11/2020	20.15		1283.22	12.50	887	577	0.76	7.06	99
GMW-11	10/3/2019	20.93	1304.57	1283.64	10.75	951	618	5.76	7.14	142
	12/12/2019	21.42		1283.15	11.00	938	599	6.58	6.99	51
	2/10/2020	22.41		1282.16	11.13	911	582	10.44	7.12	87
	5/11/2020	22.80		1281.77	11.10	866	562	7.11	7.29	218
GMW-13	10/3/2019	12.63	1297.27	1284.64	11.04	948	616	1.70	7.08	-95
	12/12/2019	21.42		1275.85	11.00	938	599	6.58	6.99	51
	2/10/2020	14.82		1282.45	10.18	864	551	2.5	6.79	-86
	5/11/2020	14.95		1282.32	9.70	890	578	0.04	7.06	-99
GMW-14	10/3/2019	11.79	1296.27	1284.48	10.90	1194	776	1.77	6.68	-33
	12/12/2019	12.76		1283.51	10.88	323	206	19.15	9.35	108
	2/10/2020	13.78		1282.49	9.17	423	269	25.21	10.60	64
	5/11/2020	13.99		1282.28	9.4	537	349	17.8	9.27	212
GMW-15	10/3/2019	32.49	1315.41	1282.92	9.91	881	573	1.50	7.13	-27
	12/12/2019	32.86		1282.55	10.37	882	564	0.51	7.02	14
	2/10/2020	33.82		1281.59	10.54	888	567	2.29	7.1	48
	5/11/2020	34.16		1281.25	12.6	860	559	0.3	7.25	-61
GMW-21	10/3/2019	39.86	1322.18	1282.32	9.82	874	568	1.52	-3.84*	558*
	12/12/2019	40.35		1281.83	10.63	848	541	3.03	7.07	22
	2/10/2020	41.24		1280.94	11.10	881	562	1.6	7.02	-37
	5/12/2020	41.49		1280.69	11.50	813	528	0.10	7.31	-86

**Notes:**

°C - degree celsius

D.O. - dissolved oxygen

ft - feet

mg/L - milligram per liter

mS/cm - millisiemens per centimeter

ORP - oxidation reduction potential

TDS - total dissolved solids

TOR - top of riser

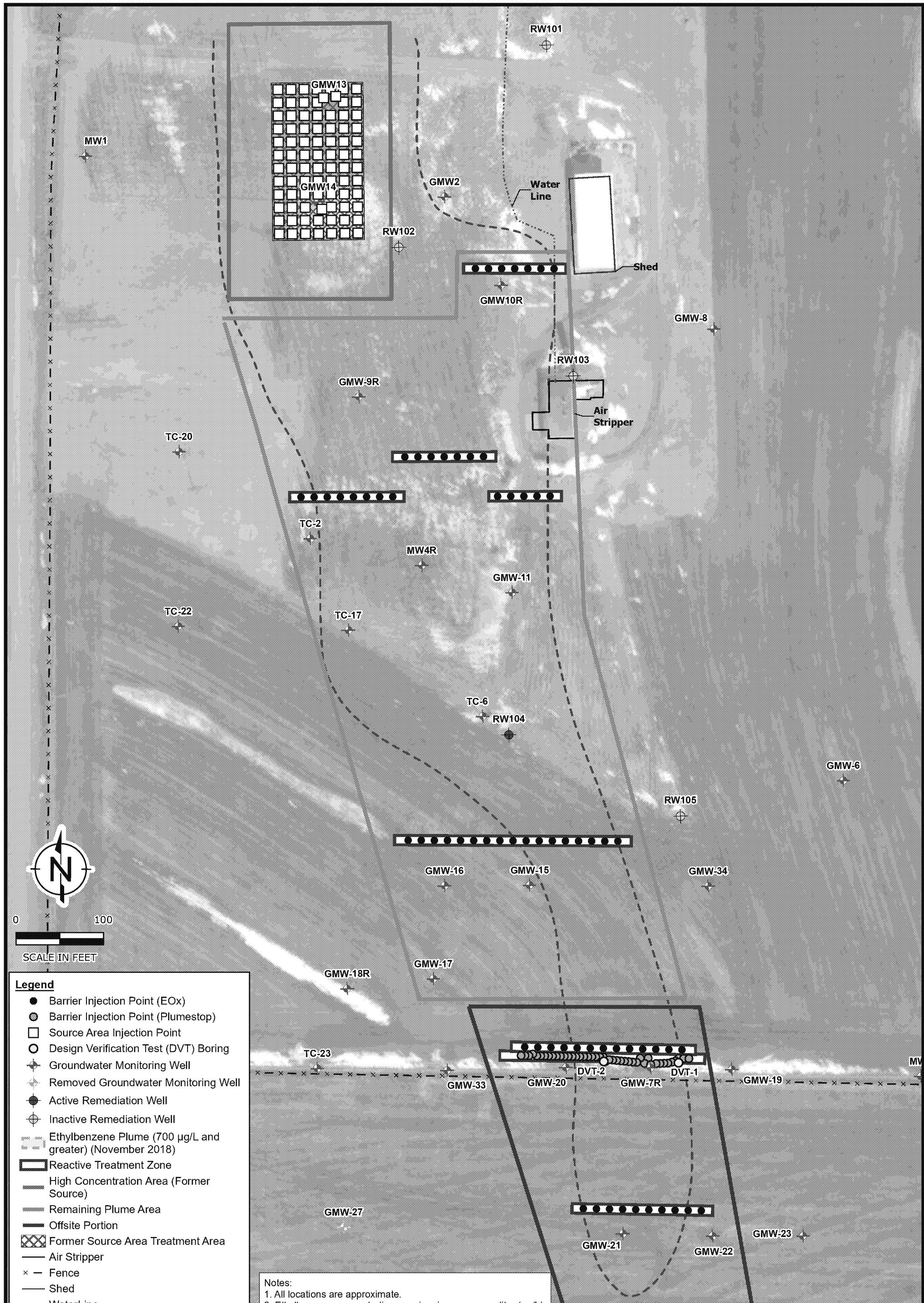
10/3/2019 results: Baseline (pre-injection)

12/12/2019 through 5/11/2020 - post-injection

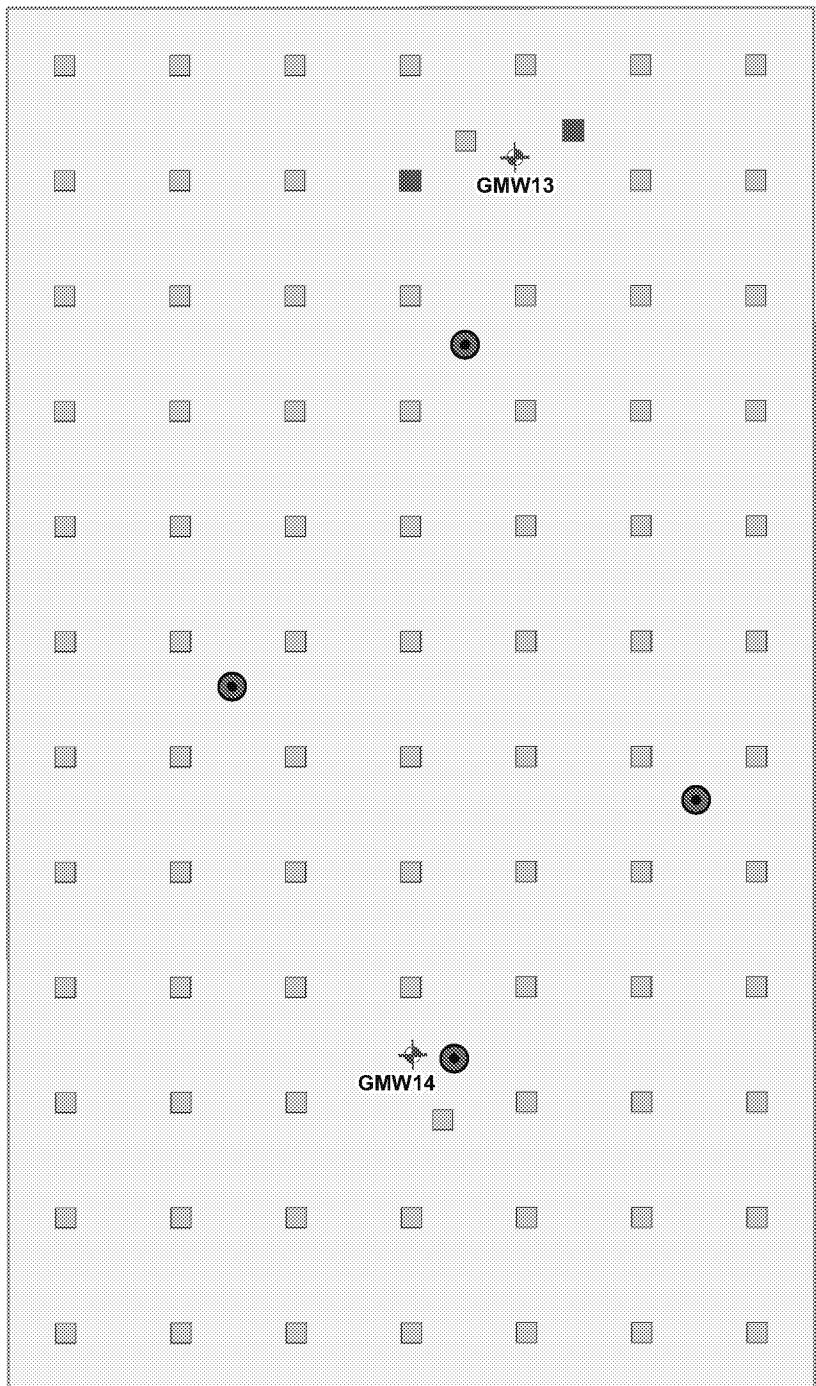
\* readings not accurate, pH/ORP probe malfunction apparent

Post-Injection Monitoring Report  
Vogel Paint and Wax Co.  
Maurice, Iowa

**FIGURES**



RAMBOLL



#### Legend

- Proposed Groundwater Sample Point
- Pilot Study Injection Point (October 2019)
- Partial Injection Due to Surfacing
- ★ Groundwater Monitoring Well
- Former Source Area Treatment Area
- Ethylbenzene Plume (700 µg/L and greater) (May 2020)

0 25  
SCALE IN FEET



**Proposed Groundwater Sample Points -  
Former Source Area**  
Vogel Paint Waste Site  
Maurice, Iowa

**FIGURE  
2**

Post-Injection Monitoring Report  
Vogel Paint and Wax Co.  
Maurice, Iowa

APPENDIX A  
LABORATORY ANALYTICAL RESULTS REPORTS

Ramboll

ED\_004945A\_00012393-00157



Environment Testing  
America

## ANALYTICAL REPORT

Eurofins TestAmerica, Cedar Falls  
3019 Venture Way  
Cedar Falls, IA 50613  
Tel: (319)277-2401

Laboratory Job ID: 310-181529-1  
Laboratory Sample Delivery Group: Ramboll #44019383  
Client Project/Site: Vogel Project Iowa

For:  
Ramboll US Corporation  
5 Park Plaza  
Suite 500  
Irvine, California 92614

Attn: Eric Smith

Danielle Roberts

Authorized for release by:  
5/20/2020 11:41:59 AM

Danielle Roberts, Senior Project Manager  
(949)260-3249  
[danielle.roberts@testamericainc.com](mailto:danielle.roberts@testamericainc.com)

### LINKS

Review your project  
results through

**Total Access**

Have a Question?

Ask—  
The  
Expert

Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	7
Definitions . . . . .	16
Surrogate Summary . . . . .	17
QC Sample Results . . . . .	18
QC Association . . . . .	25
Chronicle . . . . .	28
Certification Summary . . . . .	31
Method Summary . . . . .	32
Chain of Custody . . . . .	33
Receipt Checklists . . . . .	35

# Case Narrative

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

**Job ID: 310-181529-1**

**Laboratory: Eurofins TestAmerica, Cedar Falls**

## Narrative

### Job Narrative 310-181529-1

#### Receipt

The samples were received on 5/12/2020 9:35 AM; the samples arrived in good condition, properly preserved, and where required, on ice. The temperature of the cooler at receipt time was 0.8°C.

#### GC/MS VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### General Chemistry

Method 353.2: The following sample was diluted due to the nature of the sample matrix: GMW-13 (310-181529-4). Elevated reporting limits (RLs) are provide

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Sample Summary

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-181529-1	GMW-7R	Ground Water	05/11/20 10:30	05/12/20 09:35	
310-181529-2	GMW-10R	Ground Water	05/11/20 13:45	05/12/20 09:35	
310-181529-3	GMW-11	Ground Water	05/11/20 12:10	05/12/20 09:35	
310-181529-4	GMW-13	Ground Water	05/11/20 14:15	05/12/20 09:35	
310-181529-5	GMW-14	Ground Water	05/11/20 14:45	05/12/20 09:35	
310-181529-6	GMW-15	Ground Water	05/11/20 12:35	05/12/20 09:35	
310-181529-7	GMW-21	Ground Water	05/11/20 11:45	05/12/20 09:35	
310-181529-8	Duplicate	Ground Water	05/11/20 00:00	05/12/20 09:35	
310-181529-9	Trip Blank	Ground Water	05/11/20 00:00	05/12/20 09:35	

Eurofins TestAmerica, Cedar Falls

# Detection Summary

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## **Client Sample ID: GMW-7R**

## **Lab Sample ID: 310-181529-1**

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	2.8		1.0	ug/L	1		8260D	Total/NA
Xylenes, Total	4.5		3.0	ug/L	1		8260D	Total/NA
Total Phosphorus as P	0.46		0.10	mg/L	1		365.1	Total/NA

## **Client Sample ID: GMW-10R**

## **Lab Sample ID: 310-181529-2**

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Benzene	10		5.0	ug/L	10		8260D	Total/NA
Ethylbenzene	6400		100	ug/L	100		8260D	Total/NA
Toluene	58		10	ug/L	10		8260D	Total/NA
Xylenes, Total	26000		300	ug/L	100		8260D	Total/NA
Total Phosphorus as P	0.33		0.10	mg/L	1		365.1	Total/NA

## **Client Sample ID: GMW-11**

## **Lab Sample ID: 310-181529-3**

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate Nitrite as N	21		1.0	mg/L	10		353.2	Total/NA

## **Client Sample ID: GMW-13**

## **Lab Sample ID: 310-181529-4**

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Benzene	6.2		5.0	ug/L	10		8260D	Total/NA
Ethylbenzene	17000		100	ug/L	100		8260D	Total/NA
Toluene	7900		10	ug/L	10		8260D	Total/NA
Xylenes, Total	87000		300	ug/L	100		8260D	Total/NA
Total Kjeldahl Nitrogen	1.6		1.0	mg/L	1		351.2	Total/NA
Total Phosphorus as P	0.15		0.10	mg/L	1		365.1	Total/NA

## **Client Sample ID: GMW-14**

## **Lab Sample ID: 310-181529-5**

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Benzene	33		5.0	ug/L	10		8260D	Total/NA
Ethylbenzene	11000		100	ug/L	100		8260D	Total/NA
Toluene	8900		10	ug/L	10		8260D	Total/NA
Xylenes, Total	79000		300	ug/L	100		8260D	Total/NA
Total Kjeldahl Nitrogen	2.1		1.0	mg/L	1		351.2	Total/NA
Total Phosphorus as P	0.10		0.10	mg/L	1		365.1	Total/NA

## **Client Sample ID: GMW-15**

## **Lab Sample ID: 310-181529-6**

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	2.7		1.0	ug/L	1		8260D	Total/NA
Xylenes, Total	57		3.0	ug/L	1		8260D	Total/NA
Nitrate Nitrite as N	1.4		0.10	mg/L	1		353.2	Total/NA

## **Client Sample ID: GMW-21**

## **Lab Sample ID: 310-181529-7**

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	170		10	ug/L	10		8260D	Total/NA
Xylenes, Total	680		30	ug/L	10		8260D	Total/NA
Nitrate Nitrite as N	1.3		0.10	mg/L	1		353.2	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

## Detection Summary

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

### Client Sample ID: Duplicate

Lab Sample ID: 310-181529-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	180		10	ug/L	10		8260D	Total/NA
Xylenes, Total	720		30	ug/L	10		8260D	Total/NA

### Client Sample ID: Trip Blank

Lab Sample ID: 310-181529-9

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: Ramboll US Corporation  
 Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
 SDG: Ramboll #44019383

**Client Sample ID: GMW-7R**  
 Date Collected: 05/11/20 10:30  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-1**  
 Matrix: Ground Water

## Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.50		0.50	ug/L			05/14/20 14:12	1
Ethylbenzene	2.8		1.0	ug/L			05/14/20 14:12	1
Toluene	<1.0		1.0	ug/L			05/14/20 14:12	1
Xylenes, Total	4.5		3.0	ug/L			05/14/20 14:12	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>		<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>	
4-Bromofluorobenzene (Surr)	83		80 - 120			05/14/20 14:12	1	
Dibromofluoromethane (Surr)	113		80 - 120			05/14/20 14:12	1	
Toluene-d8 (Surr)	96		80 - 120			05/14/20 14:12	1	

## General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<1.0		1.0	mg/L		05/18/20 08:28	05/18/20 19:32	1
Nitrate Nitrite as N	<0.10		0.10	mg/L			05/15/20 18:16	1
Total Phosphorus as P	0.46		0.10	mg/L		05/14/20 09:39	05/14/20 19:28	1

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: Ramboll US Corporation  
 Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
 SDG: Ramboll #44019383

**Client Sample ID: GMW-10R**

Date Collected: 05/11/20 13:45  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-2**

Matrix: Ground Water

## Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	10		5.0	ug/L			05/14/20 19:46	10
Ethylbenzene	6400		100	ug/L			05/15/20 19:05	100
Toluene	58		10	ug/L			05/14/20 19:46	10
Xylenes, Total	26000		300	ug/L			05/15/20 19:05	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>		<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>	
4-Bromofluorobenzene (Surr)	103		80 - 120			05/14/20 19:46	10	
4-Bromofluorobenzene (Surr)	99		80 - 120			05/15/20 19:05	100	
Dibromofluoromethane (Surr)	111		80 - 120			05/14/20 19:46	10	
Dibromofluoromethane (Surr)	102		80 - 120			05/15/20 19:05	100	
Toluene-d8 (Surr)	99		80 - 120			05/14/20 19:46	10	
Toluene-d8 (Surr)	99		80 - 120			05/15/20 19:05	100	

## General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<1.0		1.0	mg/L		05/18/20 08:28	05/18/20 19:33	1
Nitrate Nitrite as N	<0.10		0.10	mg/L			05/15/20 18:17	1
Total Phosphorus as P	0.33		0.10	mg/L		05/14/20 09:39	05/14/20 19:29	1

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: Ramboll US Corporation  
 Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
 SDG: Ramboll #44019383

**Client Sample ID: GMW-11**  
 Date Collected: 05/11/20 12:10  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-3**  
 Matrix: Ground Water

## Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.50		0.50	ug/L			05/14/20 14:35	1
Ethylbenzene	<1.0		1.0	ug/L			05/14/20 14:35	1
Toluene	<1.0		1.0	ug/L			05/14/20 14:35	1
Xylenes, Total	<3.0		3.0	ug/L			05/14/20 14:35	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>			<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	86		80 - 120				05/14/20 14:35	1
Dibromofluoromethane (Surr)	116		80 - 120				05/14/20 14:35	1
Toluene-d8 (Surr)	95		80 - 120				05/14/20 14:35	1

## General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<1.0		1.0	mg/L		05/18/20 08:28	05/18/20 19:34	1
Nitrate Nitrite as N	21		1.0	mg/L			05/15/20 18:18	10
Total Phosphorus as P	<0.10		0.10	mg/L		05/14/20 09:39	05/14/20 19:22	1

# Client Sample Results

Client: Ramboll US Corporation  
 Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
 SDG: Ramboll #44019383

**Client Sample ID: GMW-13**

Date Collected: 05/11/20 14:15  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-4**

Matrix: Ground Water

## Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	6.2		5.0	ug/L			05/14/20 20:09	10
Ethylbenzene	17000		100	ug/L			05/15/20 19:27	100
Toluene	7900		10	ug/L			05/14/20 20:09	10
Xylenes, Total	87000		300	ug/L			05/15/20 19:27	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>		<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>	
4-Bromofluorobenzene (Surr)	108		80 - 120				05/14/20 20:09	10
4-Bromofluorobenzene (Surr)	98		80 - 120				05/15/20 19:27	100
Dibromofluoromethane (Surr)	97		80 - 120				05/14/20 20:09	10
Dibromofluoromethane (Surr)	98		80 - 120				05/15/20 19:27	100
Toluene-d8 (Surr)	96		80 - 120				05/14/20 20:09	10
Toluene-d8 (Surr)	98		80 - 120				05/15/20 19:27	100

## General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	1.6		1.0	mg/L		05/18/20 08:28	05/18/20 19:34	1
Nitrate Nitrite as N	<1.0		1.0	mg/L			05/15/20 18:38	10
Total Phosphorus as P	0.15		0.10	mg/L		05/14/20 09:45	05/14/20 20:44	1

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: Ramboll US Corporation  
 Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
 SDG: Ramboll #44019383

**Client Sample ID: GMW-14**  
 Date Collected: 05/11/20 14:45  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-5**  
 Matrix: Ground Water

## Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	33		5.0	ug/L			05/14/20 20:31	10
Ethylbenzene	11000		100	ug/L			05/15/20 19:50	100
Toluene	8900		10	ug/L			05/14/20 20:31	10
Xylenes, Total	79000		300	ug/L			05/15/20 19:50	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>		<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>	
4-Bromofluorobenzene (Surr)	104		80 - 120				05/14/20 20:31	10
4-Bromofluorobenzene (Surr)	98		80 - 120				05/15/20 19:50	100
Dibromofluoromethane (Surr)	94		80 - 120				05/14/20 20:31	10
Dibromofluoromethane (Surr)	98		80 - 120				05/15/20 19:50	100
Toluene-d8 (Surr)	99		80 - 120				05/14/20 20:31	10
Toluene-d8 (Surr)	99		80 - 120				05/15/20 19:50	100

## General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	2.1		1.0	mg/L		05/18/20 08:28	05/18/20 19:35	1
Nitrate Nitrite as N	<0.10		0.10	mg/L			05/15/20 18:20	1
Total Phosphorus as P	0.10		0.10	mg/L		05/14/20 09:39	05/14/20 19:26	1

# Client Sample Results

Client: Ramboll US Corporation  
 Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
 SDG: Ramboll #44019383

**Client Sample ID: GMW-15**  
 Date Collected: 05/11/20 12:35  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-6**  
 Matrix: Ground Water

## Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.50		0.50	ug/L			05/14/20 14:57	1
Ethylbenzene	2.7		1.0	ug/L			05/14/20 14:57	1
Toluene	<1.0		1.0	ug/L			05/14/20 14:57	1
Xylenes, Total	57		3.0	ug/L			05/14/20 14:57	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>		<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>	
4-Bromofluorobenzene (Surr)	90		80 - 120			05/14/20 14:57	1	
Dibromofluoromethane (Surr)	117		80 - 120			05/14/20 14:57	1	
Toluene-d8 (Surr)	95		80 - 120			05/14/20 14:57	1	

## General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<1.0		1.0	mg/L		05/18/20 08:28	05/18/20 19:41	1
Nitrate Nitrite as N	1.4		0.10	mg/L			05/15/20 18:21	1
Total Phosphorus as P	<0.10		0.10	mg/L		05/14/20 09:41	05/14/20 20:09	1

# Client Sample Results

Client: Ramboll US Corporation  
 Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
 SDG: Ramboll #44019383

**Client Sample ID: GMW-21**

Date Collected: 05/11/20 11:45  
 Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-7**

Matrix: Ground Water

## Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<5.0		5.0	ug/L			05/18/20 16:37	10
Ethylbenzene	170		10	ug/L			05/18/20 16:37	10
Toluene	<10		10	ug/L			05/18/20 16:37	10
Xylenes, Total	680		30	ug/L			05/18/20 16:37	10
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>		<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>	
4-Bromofluorobenzene (Surr)	103		80 - 120			05/18/20 16:37	10	
Dibromofluoromethane (Surr)	106		80 - 120			05/18/20 16:37	10	
Toluene-d8 (Surr)	99		80 - 120			05/18/20 16:37	10	

## General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<1.0		1.0	mg/L		05/18/20 08:28	05/18/20 19:42	1
Nitrate Nitrite as N	1.3		0.10	mg/L			05/15/20 18:22	1
Total Phosphorus as P	<0.10		0.10	mg/L		05/14/20 09:39	05/14/20 19:40	1

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

**Client Sample ID: Duplicate**

Date Collected: 05/11/20 00:00  
Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-8**

Matrix: Ground Water

## Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<5.0		5.0	ug/L			05/18/20 17:03	10
Ethylbenzene	180		10	ug/L			05/18/20 17:03	10
Toluene	<10		10	ug/L			05/18/20 17:03	10
Xylenes, Total	720		30	ug/L			05/18/20 17:03	10
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		80 - 120				05/18/20 17:03	10
Dibromofluoromethane (Surr)	107		80 - 120				05/18/20 17:03	10
Toluene-d8 (Surr)	98		80 - 120				05/18/20 17:03	10

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

**Client Sample ID: Trip Blank**

Date Collected: 05/11/20 00:00  
Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-9**

Matrix: Ground Water

## Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.50		0.50	ug/L			05/14/20 13:50	1
Ethylbenzene	<1.0		1.0	ug/L			05/14/20 13:50	1
Toluene	<1.0		1.0	ug/L			05/14/20 13:50	1
Xylenes, Total	<3.0		3.0	ug/L			05/14/20 13:50	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		80 - 120				05/14/20 13:50	1
Dibromofluoromethane (Surr)	109		80 - 120				05/14/20 13:50	1
Toluene-d8 (Surr)	96		80 - 120				05/14/20 13:50	1

# Definitions/Glossary

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## Qualifiers

### General Chemistry

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.

## Glossary

### Abbreviation

These commonly used abbreviations may or may not be present in this report.

%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Surrogate Summary

Client: Ramboll US Corporation  
 Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
 SDG: Ramboll #44019383

## Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Ground Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		BFB (80-120)	DBFM (80-120)	TOL (80-120)
310-181529-1	GMW-7R	83	113	96
310-181529-1 MS	GMW-7R	95	100	99
310-181529-1 MSD	GMW-7R	95	101	99
310-181529-2	GMW-10R	103	111	99
310-181529-2	GMW-10R	99	102	99
310-181529-3	GMW-11	86	116	95
310-181529-4	GMW-13	108	97	96
310-181529-4	GMW-13	98	98	98
310-181529-5	GMW-14	104	94	99
310-181529-5	GMW-14	98	98	99
310-181529-6	GMW-15	90	117	95
310-181529-7	GMW-21	103	106	99
310-181529-8	Duplicate	102	107	98
310-181529-9	Trip Blank	86	109	96

### Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

TOL = Toluene-d8 (Surr)

## Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		BFB (80-120)	DBFM (80-120)	TOL (80-120)
310-181751-F-4 MS	Matrix Spike	99	100	99
310-181751-F-4 MSD	Matrix Spike Duplicate	99	100	98
310-181917-B-3 MSD	Matrix Spike Duplicate	101	103	100
LCS 310-278849/6	Lab Control Sample	100	101	102
LCS 310-278966/6	Lab Control Sample	101	101	99
LCS 310-279177/6	Lab Control Sample	100	102	99
MB 310-278849/5	Method Blank	84	113	96
MB 310-278966/5	Method Blank	93	101	97
MB 310-279177/5	Method Blank	99	105	98

### Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

TOL = Toluene-d8 (Surr)

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## Method: 8260D - Volatile Organic Compounds by GC/MS

**Lab Sample ID:** MB 310-278849/5

**Matrix:** Water

**Analysis Batch:** 278849

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA

Analyte	MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Benzene	<0.50		0.50	ug/L			05/14/20 13:05	1
Ethylbenzene	<1.0		1.0	ug/L			05/14/20 13:05	1
Toluene	<1.0		1.0	ug/L			05/14/20 13:05	1
Xylenes, Total	<3.0		3.0	ug/L			05/14/20 13:05	1

Surrogate	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
4-Bromofluorobenzene (Surr)	84		80 - 120		05/14/20 13:05	1
Dibromofluoromethane (Surr)	113		80 - 120		05/14/20 13:05	1
Toluene-d8 (Surr)	96		80 - 120		05/14/20 13:05	1

**Lab Sample ID:** LCS 310-278849/6

**Matrix:** Water

**Analysis Batch:** 278849

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.
	Added	Result						
Benzene	20.0	20.5	ug/L		103	77 - 120		
Ethylbenzene	20.0	22.0	ug/L		110	73 - 120		
Toluene	20.0	21.0	ug/L		105	74 - 120		
Xylenes, Total	40.0	42.4	ug/L		106	69 - 120		

Surrogate	LCS		Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	100		80 - 120
Dibromofluoromethane (Surr)	101		80 - 120
Toluene-d8 (Surr)	102		80 - 120

**Lab Sample ID:** 310-181529-1 MS

**Matrix:** Ground Water

**Analysis Batch:** 278849

**Client Sample ID:** GMW-7R  
**Prep Type:** Total/NA

Analyte	Sample		Spike Added	MS		Unit	D	%Rec	%Rec.
	Result	Qualifier		Result	Qualifier				
Benzene	<0.50		20.0	14.4		ug/L	72	59 - 120	
Ethylbenzene	2.8		20.0	19.1		ug/L	82	46 - 120	
Toluene	<1.0		20.0	11.3		ug/L	56	52 - 120	
Xylenes, Total	4.5		40.0	33.5		ug/L	73	37 - 120	

Surrogate	MS		Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	95		80 - 120
Dibromofluoromethane (Surr)	100		80 - 120
Toluene-d8 (Surr)	99		80 - 120

**Lab Sample ID:** 310-181529-1 MSD

**Matrix:** Ground Water

**Analysis Batch:** 278849

**Client Sample ID:** GMW-7R  
**Prep Type:** Total/NA

Analyte	Sample		Spike Added	MSD		Unit	D	%Rec	%Rec.
	Result	Qualifier		Result	Qualifier				
Benzene	<0.50		20.0	13.9		ug/L	70	59 - 120	3 21
Ethylbenzene	2.8		20.0	18.2		ug/L	77	46 - 120	5 23
Toluene	<1.0		20.0	10.6		ug/L	53	52 - 120	6 23

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID:** 310-181529-1 MSD

**Matrix:** Ground Water

**Analysis Batch:** 278849

**Client Sample ID:** GMW-7R  
**Prep Type:** Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier						
Xylenes, Total	4.5		40.0	31.2		ug/L		67	37 - 120	7	34
<b>Surrogate</b>											
4-Bromofluorobenzene (Surr)	95			80 - 120							
Dibromofluoromethane (Surr)	101			80 - 120							
Toluene-d8 (Surr)	99			80 - 120							

**Lab Sample ID:** MB 310-278966/5

**Matrix:** Water

**Analysis Batch:** 278966

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac			
	Result	Qualifier									
Benzene	<0.50		0.50	ug/L			05/15/20 11:58	1			
Ethylbenzene	<1.0		1.0	ug/L			05/15/20 11:58	1			
Toluene	<1.0		1.0	ug/L			05/15/20 11:58	1			
Xylenes, Total	<3.0		3.0	ug/L			05/15/20 11:58	1			
<b>Surrogate</b>											
4-Bromofluorobenzene (Surr)	93		80 - 120				05/15/20 11:58	1			
Dibromofluoromethane (Surr)	101		80 - 120				05/15/20 11:58	1			
Toluene-d8 (Surr)	97		80 - 120				05/15/20 11:58	1			

**Lab Sample ID:** LCS 310-278966/6

**Matrix:** Water

**Analysis Batch:** 278966

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.				
	Added	Result	Qualifier								
Benzene	20.0	19.8		ug/L		99	77 - 120				
Ethylbenzene	20.0	20.8		ug/L		104	73 - 120				
Toluene	20.0	19.6		ug/L		98	74 - 120				
Xylenes, Total	40.0	40.8		ug/L		102	69 - 120				
<b>Surrogate</b>											
4-Bromofluorobenzene (Surr)	101		80 - 120								
Dibromofluoromethane (Surr)	101		80 - 120								
Toluene-d8 (Surr)	99		80 - 120								

**Lab Sample ID:** 310-181751-F-4 MS

**Matrix:** Water

**Analysis Batch:** 278966

**Client Sample ID:** Matrix Spike  
**Prep Type:** Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Benzene	<0.50		20.0	14.2		ug/L		71	59 - 120
Ethylbenzene	5.3		20.0	20.0		ug/L		73	46 - 120
Toluene	3.0		20.0	16.8		ug/L		69	52 - 120
Xylenes, Total	8.8		40.0	41.3		ug/L		81	37 - 120

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID:** 310-181751-F-4 MS

**Matrix:** Water

**Analysis Batch:** 278966

**Client Sample ID:** Matrix Spike  
**Prep Type:** Total/NA

Surrogate	MS		Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Sur)	99		80 - 120
Dibromofluoromethane (Sur)	100		80 - 120
Toluene-d8 (Sur)	99		80 - 120

**Lab Sample ID:** 310-181751-F-4 MSD

**Matrix:** Water

**Analysis Batch:** 278966

**Client Sample ID:** Matrix Spike Duplicate  
**Prep Type:** Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Benzene	<0.50		20.0	14.1		ug/L	71	59 - 120	1	21	
Ethylbenzene	5.3		20.0	19.6		ug/L	72	46 - 120	2	23	
Toluene	3.0		20.0	16.6		ug/L	68	52 - 120	2	23	
Xylenes, Total	8.8		40.0	40.3		ug/L	79	37 - 120	2	34	

Surrogate	MSD		Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Sur)	99		80 - 120
Dibromofluoromethane (Sur)	100		80 - 120
Toluene-d8 (Sur)	98		80 - 120

**Lab Sample ID:** MB 310-279177/5

**Matrix:** Water

**Analysis Batch:** 279177

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Benzene	<0.50		0.50	ug/L		05/18/20 11:23		1
Ethylbenzene	<1.0		1.0	ug/L		05/18/20 11:23		1
Toluene	<1.0		1.0	ug/L		05/18/20 11:23		1
Xylenes, Total	<3.0		3.0	ug/L		05/18/20 11:23		1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
4-Bromofluorobenzene (Sur)	99		80 - 120		05/18/20 11:23	1
Dibromofluoromethane (Sur)	105		80 - 120		05/18/20 11:23	1
Toluene-d8 (Sur)	98		80 - 120		05/18/20 11:23	1

**Lab Sample ID:** LCS 310-279177/6

**Matrix:** Water

**Analysis Batch:** 279177

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Benzene	20.0	18.6		ug/L		93	77 - 120
Ethylbenzene	20.0	19.4		ug/L		97	73 - 120
Toluene	20.0	18.8		ug/L		94	74 - 120
Xylenes, Total	40.0	38.7		ug/L		97	69 - 120

Surrogate	LCS	LCS	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
4-Bromofluorobenzene (Sur)	100		80 - 120		05/18/20 11:23	1
Dibromofluoromethane (Sur)	102		80 - 120		05/18/20 11:23	1

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-279177/6

Matrix: Water

Analysis Batch: 279177

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Surrogate	LCS	LCS
	%Recovery	Qualifier
Toluene-d8 (Sur)	99	80 - 120

Lab Sample ID: 310-181917-B-3 MSD

Matrix: Water

Analysis Batch: 279177

Client Sample ID: Matrix Spike Duplicate  
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Benzene	0.64	F1	20.0	18.6		ug/L		90	59 - 120	NC	21
Ethylbenzene	2.7	F1	20.0	21.3		ug/L		93	46 - 120	NC	23
Toluene	ND	F1	20.0	19.4		ug/L		97	52 - 120	NC	23
Xylenes, Total	12	F1	40.0	44.6		ug/L		82	37 - 120	NC	34

Surrogate	MSD	MSD
	%Recovery	Qualifier
4-Bromofluorobenzene (Sur)	101	80 - 120
Dibromofluoromethane (Sur)	103	80 - 120
Toluene-d8 (Sur)	100	80 - 120

## Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 310-279138/1-A

Matrix: Water

Analysis Batch: 279270

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 279138

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Total Kjeldahl Nitrogen	<1.0		1.0	mg/L		05/18/20 08:28	05/18/20 19:16	1

Lab Sample ID: LCS 310-279138/2-A

Matrix: Water

Analysis Batch: 279270

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 279138  
%Rec.

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Total Kjeldahl Nitrogen	4.01	3.91		mg/L		97	90 - 110

Lab Sample ID: 310-181326-B-1-B MS

Matrix: Water

Analysis Batch: 279270

Client Sample ID: Matrix Spike  
Prep Type: Total/NA  
Prep Batch: 279138  
%Rec.

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Kjeldahl Nitrogen	2.9		4.01	6.79		mg/L		97	90 - 110

Lab Sample ID: 310-181326-B-1-C MSD

Matrix: Water

Analysis Batch: 279270

Client Sample ID: Matrix Spike Duplicate  
Prep Type: Total/NA  
Prep Batch: 279138

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	RPD
	Result	Qualifier	Added	Result	Qualifier				
Total Kjeldahl Nitrogen	2.9		4.01	6.58		mg/L		91	90 - 110

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## Method: 353.2 - Nitrogen, Nitrate-Nitrite

**Lab Sample ID:** MB 310-279050/43

**Matrix:** Water

**Analysis Batch:** 279050

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.10		0.10	mg/L			05/15/20 17:03	1

**Lab Sample ID:** MB 310-279050/77

**Matrix:** Water

**Analysis Batch:** 279050

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.10		0.10	mg/L			05/15/20 17:55	1

**Lab Sample ID:** LCS 310-279050/44

**Matrix:** Water

**Analysis Batch:** 279050

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Nitrate Nitrite as N	20.3	21.1		mg/L	104	90 - 110	

**Lab Sample ID:** LCS 310-279050/78

**Matrix:** Water

**Analysis Batch:** 279050

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Nitrate Nitrite as N	20.3	21.0		mg/L	103	90 - 110	

**Lab Sample ID:** 310-181238-C-1 MS

**Matrix:** Water

**Analysis Batch:** 279050

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	Limits
Nitrate Nitrite as N	3.8		0.500	4.13	4	mg/L	67	90 - 110	

**Lab Sample ID:** 310-181238-C-1 MSD

**Matrix:** Water

**Analysis Batch:** 279050

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec.	RPD	Limit
Nitrate Nitrite as N	3.8		0.500	4.13	4	mg/L	66	90 - 110	0	20

**Lab Sample ID:** 310-181291-A-1 MS ^10

**Matrix:** Water

**Analysis Batch:** 279050

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	Limits
Nitrate Nitrite as N	20	F1	5.00	23.8	F1	mg/L	81	90 - 110	

**Lab Sample ID:** 310-181291-A-1 MSD ^10

**Matrix:** Water

**Analysis Batch:** 279050

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec.	RPD	Limit
Nitrate Nitrite as N	20	F1	5.00	23.4	F1	mg/L	73	90 - 110	2	20

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## Method: 365.1 - Phosphorus, Total

**Lab Sample ID:** MB 310-278824/1-A

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Total Phosphorus as P	<0.10		0.10	mg/L		05/14/20 09:39	05/14/20 19:11	1

**Lab Sample ID:** LCS 310-278824/2-A

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Total Phosphorus as P	5.01	5.23		mg/L		104	90 - 110

**Lab Sample ID:** 310-181470-A-1-B MS

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Phosphorus as P	3.2		1.00	4.24		mg/L		103	90 - 110

**Lab Sample ID:** 310-181470-A-1-C MSD

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Total Phosphorus as P	3.2		1.00	4.23		mg/L		102	90 - 110	0	19

**Lab Sample ID:** MB 310-278828/1-A

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Total Phosphorus as P	<0.10		0.10	mg/L		05/14/20 09:41	05/14/20 19:55	1

**Lab Sample ID:** LCS 310-278828/2-A

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Total Phosphorus as P	5.01	5.35		mg/L		107	90 - 110

**Lab Sample ID:** 310-181611-A-2-B MS ^20

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Phosphorus as P	24		1.00	25.7	4	mg/L		186	90 - 110

**Lab Sample ID:** 310-181611-A-2-C MSD ^20

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	
	Result	Qualifier	Added	Result	Qualifier						
Total Phosphorus as P	24		1.00	25.5	4	mg/L		160	90 - 110	1	19

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: Ramboll US Corporation  
 Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
 SDG: Ramboll #44019383

## Method: 365.1 - Phosphorus, Total

**Lab Sample ID:** MB 310-278829/1-A

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	<0.10		0.10	mg/L		05/14/20 09:45	05/14/20 20:42	1

**Lab Sample ID:** LCS 310-278829/2-A

**Matrix:** Water

**Analysis Batch:** 278906

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Total Phosphorus as P	5.01	5.40		mg/L		108	90 - 110

**Lab Sample ID:** 310-181529-4 MS

**Matrix:** Ground Water

**Analysis Batch:** 278906

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	Limits
Total Phosphorus as P	0.15		1.00	1.25		mg/L		110	90 - 110

**Lab Sample ID:** 310-181529-4 MSD

**Matrix:** Ground Water

**Analysis Batch:** 278906

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec.	RPD	Limit	
Total Phosphorus as P	0.15		1.00	1.21		mg/L		105	90 - 110	3	19

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 278829

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 278829

**%Rec.**

**Client Sample ID:** GMW-13

**Prep Type:** Total/NA

**Prep Batch:** 278829

**%Rec.**

**Client Sample ID:** GMW-13

**Prep Type:** Total/NA

**Prep Batch:** 278829

**%Rec.**

**Client Sample ID:** GMW-13

**Prep Type:** Total/NA

**Prep Batch:** 278829

**%Rec.**

**RPD**

Eurofins TestAmerica, Cedar Falls

# QC Association Summary

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## GC/MS VOA

### Analysis Batch: 278849

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-1	GMW-7R	Total/NA	Ground Water	8260D	
310-181529-2	GMW-10R	Total/NA	Ground Water	8260D	
310-181529-3	GMW-11	Total/NA	Ground Water	8260D	
310-181529-4	GMW-13	Total/NA	Ground Water	8260D	
310-181529-5	GMW-14	Total/NA	Ground Water	8260D	
310-181529-6	GMW-15	Total/NA	Ground Water	8260D	
310-181529-9	Trip Blank	Total/NA	Ground Water	8260D	
MB 310-278849/5	Method Blank	Total/NA	Water	8260D	
LCS 310-278849/6	Lab Control Sample	Total/NA	Water	8260D	
310-181529-1 MS	GMW-7R	Total/NA	Ground Water	8260D	
310-181529-1 MSD	GMW-7R	Total/NA	Ground Water	8260D	

### Analysis Batch: 278966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-2	GMW-10R	Total/NA	Ground Water	8260D	
310-181529-4	GMW-13	Total/NA	Ground Water	8260D	
310-181529-5	GMW-14	Total/NA	Ground Water	8260D	
MB 310-278966/5	Method Blank	Total/NA	Water	8260D	
LCS 310-278966/6	Lab Control Sample	Total/NA	Water	8260D	
310-181751-F-4 MS	Matrix Spike	Total/NA	Water	8260D	
310-181751-F-4 MSD	Matrix Spike Duplicate	Total/NA	Water	8260D	

### Analysis Batch: 279177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-7	GMW-21	Total/NA	Ground Water	8260D	
310-181529-8	Duplicate	Total/NA	Ground Water	8260D	
MB 310-279177/5	Method Blank	Total/NA	Water	8260D	
LCS 310-279177/6	Lab Control Sample	Total/NA	Water	8260D	
310-181917-B-3 MSD	Matrix Spike Duplicate	Total/NA	Water	8260D	

## General Chemistry

### Prep Batch: 278824

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-1	GMW-7R	Total/NA	Ground Water	365.2/365.3/365	
310-181529-2	GMW-10R	Total/NA	Ground Water	365.2/365.3/365	
310-181529-3	GMW-11	Total/NA	Ground Water	365.2/365.3/365	
310-181529-5	GMW-14	Total/NA	Ground Water	365.2/365.3/365	
310-181529-7	GMW-21	Total/NA	Ground Water	365.2/365.3/365	
MB 310-278824/1-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 310-278824/2-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
310-181470-A-1-B MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
310-181470-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

### Prep Batch: 278828

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-6	GMW-15	Total/NA	Ground Water	365.2/365.3/365	
MB 310-278828/1-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 310-278828/2-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
310-181611-A-2-B MS ^20	Matrix Spike	Total/NA	Water	365.2/365.3/365	
310-181611-A-2-C MSD ^20	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

Eurofins TestAmerica, Cedar Falls

# QC Association Summary

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## General Chemistry

### Prep Batch: 278829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-4	GMW-13	Total/NA	Ground Water	365.2/365.3/365	
MB 310-278829/1-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 310-278829/2-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
310-181529-4 MS	GMW-13	Total/NA	Ground Water	365.2/365.3/365	
310-181529-4 MSD	GMW-13	Total/NA	Ground Water	365.2/365.3/365	

### Analysis Batch: 278906

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-1	GMW-7R	Total/NA	Ground Water	365.1	278824
310-181529-2	GMW-10R	Total/NA	Ground Water	365.1	278824
310-181529-3	GMW-11	Total/NA	Ground Water	365.1	278824
310-181529-4	GMW-13	Total/NA	Ground Water	365.1	278829
310-181529-5	GMW-14	Total/NA	Ground Water	365.1	278824
310-181529-6	GMW-15	Total/NA	Ground Water	365.1	278828
310-181529-7	GMW-21	Total/NA	Ground Water	365.1	278824
MB 310-278824/1-A	Method Blank	Total/NA	Water	365.1	278824
MB 310-278828/1-A	Method Blank	Total/NA	Water	365.1	278828
MB 310-278829/1-A	Method Blank	Total/NA	Water	365.1	278829
LCS 310-278824/2-A	Lab Control Sample	Total/NA	Water	365.1	278824
LCS 310-278828/2-A	Lab Control Sample	Total/NA	Water	365.1	278828
LCS 310-278829/2-A	Lab Control Sample	Total/NA	Water	365.1	278829
310-181470-A-1-B MS	Matrix Spike	Total/NA	Water	365.1	278824
310-181470-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	365.1	278824
310-181529-4 MS	GMW-13	Total/NA	Ground Water	365.1	278829
310-181529-4 MSD	GMW-13	Total/NA	Ground Water	365.1	278829
310-181611-A-2-B MS ^20	Matrix Spike	Total/NA	Water	365.1	278828
310-181611-A-2-C MSD ^20	Matrix Spike Duplicate	Total/NA	Water	365.1	278828

### Analysis Batch: 279050

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-1	GMW-7R	Total/NA	Ground Water	353.2	
310-181529-2	GMW-10R	Total/NA	Ground Water	353.2	
310-181529-3	GMW-11	Total/NA	Ground Water	353.2	
310-181529-4	GMW-13	Total/NA	Ground Water	353.2	
310-181529-5	GMW-14	Total/NA	Ground Water	353.2	
310-181529-6	GMW-15	Total/NA	Ground Water	353.2	
310-181529-7	GMW-21	Total/NA	Ground Water	353.2	
MB 310-279050/43	Method Blank	Total/NA	Water	353.2	
MB 310-279050/77	Method Blank	Total/NA	Water	353.2	
LCS 310-279050/44	Lab Control Sample	Total/NA	Water	353.2	
LCS 310-279050/78	Lab Control Sample	Total/NA	Water	353.2	
310-181238-C-1 MS	Matrix Spike	Total/NA	Water	353.2	
310-181238-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	353.2	
310-181291-A-1 MS ^10	Matrix Spike	Total/NA	Water	353.2	
310-181291-A-1 MSD ^10	Matrix Spike Duplicate	Total/NA	Water	353.2	

### Prep Batch: 279138

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-1	GMW-7R	Total/NA	Ground Water	351.2	
310-181529-2	GMW-10R	Total/NA	Ground Water	351.2	
310-181529-3	GMW-11	Total/NA	Ground Water	351.2	

Eurofins TestAmerica, Cedar Falls

# QC Association Summary

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## General Chemistry (Continued)

### Prep Batch: 279138 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-4	GMW-13	Total/NA	Ground Water	351.2	
310-181529-5	GMW-14	Total/NA	Ground Water	351.2	
310-181529-6	GMW-15	Total/NA	Ground Water	351.2	
310-181529-7	GMW-21	Total/NA	Ground Water	351.2	
MB 310-279138/1-A	Method Blank	Total/NA	Water	351.2	
LCS 310-279138/2-A	Lab Control Sample	Total/NA	Water	351.2	
310-181326-B-1-B MS	Matrix Spike	Total/NA	Water	351.2	
310-181326-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	

### Analysis Batch: 279270

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-181529-1	GMW-7R	Total/NA	Ground Water	351.2	279138
310-181529-2	GMW-10R	Total/NA	Ground Water	351.2	279138
310-181529-3	GMW-11	Total/NA	Ground Water	351.2	279138
310-181529-4	GMW-13	Total/NA	Ground Water	351.2	279138
310-181529-5	GMW-14	Total/NA	Ground Water	351.2	279138
310-181529-6	GMW-15	Total/NA	Ground Water	351.2	279138
310-181529-7	GMW-21	Total/NA	Ground Water	351.2	279138
MB 310-279138/1-A	Method Blank	Total/NA	Water	351.2	279138
LCS 310-279138/2-A	Lab Control Sample	Total/NA	Water	351.2	279138
310-181326-B-1-B MS	Matrix Spike	Total/NA	Water	351.2	279138
310-181326-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	279138

# Lab Chronicle

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

**Client Sample ID: GMW-7R**

Date Collected: 05/11/20 10:30

Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-1**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	278849	05/14/20 14:12	TRZ	TAL CF
Total/NA	Prep	351.2			279138	05/18/20 08:28	WJF	TAL CF
Total/NA	Analysis	351.2		1	279270	05/18/20 19:32	JMH	TAL CF
Total/NA	Analysis	353.2		1	279050	05/15/20 18:16	JMH	TAL CF
Total/NA	Prep	365.2/365.3/365			278824	05/14/20 09:39	JWG	TAL CF
Total/NA	Analysis	365.1		1	278906	05/14/20 19:28	JMH	TAL CF

**Client Sample ID: GMW-10R**

Date Collected: 05/11/20 13:45

Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-2**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		10	278849	05/14/20 19:46	TRZ	TAL CF
Total/NA	Analysis	8260D		100	278966	05/15/20 19:05	TRZ	TAL CF
Total/NA	Prep	351.2			279138	05/18/20 08:28	WJF	TAL CF
Total/NA	Analysis	351.2		1	279270	05/18/20 19:33	JMH	TAL CF
Total/NA	Analysis	353.2		1	279050	05/15/20 18:17	JMH	TAL CF
Total/NA	Prep	365.2/365.3/365			278824	05/14/20 09:39	JWG	TAL CF
Total/NA	Analysis	365.1		1	278906	05/14/20 19:29	JMH	TAL CF

**Client Sample ID: GMW-11**

Date Collected: 05/11/20 12:10

Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-3**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	278849	05/14/20 14:35	TRZ	TAL CF
Total/NA	Prep	351.2			279138	05/18/20 08:28	WJF	TAL CF
Total/NA	Analysis	351.2		1	279270	05/18/20 19:34	JMH	TAL CF
Total/NA	Analysis	353.2		10	279050	05/15/20 18:18	JMH	TAL CF
Total/NA	Prep	365.2/365.3/365			278824	05/14/20 09:39	JWG	TAL CF
Total/NA	Analysis	365.1		1	278906	05/14/20 19:22	JMH	TAL CF

**Client Sample ID: GMW-13**

Date Collected: 05/11/20 14:15

Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-4**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		10	278849	05/14/20 20:09	TRZ	TAL CF
Total/NA	Analysis	8260D		100	278966	05/15/20 19:27	TRZ	TAL CF
Total/NA	Prep	351.2			279138	05/18/20 08:28	WJF	TAL CF
Total/NA	Analysis	351.2		1	279270	05/18/20 19:34	JMH	TAL CF
Total/NA	Analysis	353.2		10	279050	05/15/20 18:38	JMH	TAL CF
Total/NA	Prep	365.2/365.3/365			278829	05/14/20 09:45	JWG	TAL CF
Total/NA	Analysis	365.1		1	278906	05/14/20 20:44	JMH	TAL CF

Eurofins TestAmerica, Cedar Falls

# Lab Chronicle

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

**Client Sample ID: GMW-14**

Date Collected: 05/11/20 14:45  
Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-5**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		10	278849	05/14/20 20:31	TRZ	TAL CF
Total/NA	Analysis	8260D		100	278966	05/15/20 19:50	TRZ	TAL CF
Total/NA	Prep	351.2			279138	05/18/20 08:28	WJF	TAL CF
Total/NA	Analysis	351.2		1	279270	05/18/20 19:35	JMH	TAL CF
Total/NA	Analysis	353.2		1	279050	05/15/20 18:20	JMH	TAL CF
Total/NA	Prep	365.2/365.3/365			278824	05/14/20 09:39	JWG	TAL CF
Total/NA	Analysis	365.1		1	278906	05/14/20 19:26	JMH	TAL CF

**Client Sample ID: GMW-15**

Date Collected: 05/11/20 12:35  
Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-6**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	278849	05/14/20 14:57	TRZ	TAL CF
Total/NA	Prep	351.2			279138	05/18/20 08:28	WJF	TAL CF
Total/NA	Analysis	351.2		1	279270	05/18/20 19:41	JMH	TAL CF
Total/NA	Analysis	353.2		1	279050	05/15/20 18:21	JMH	TAL CF
Total/NA	Prep	365.2/365.3/365			278828	05/14/20 09:41	JWG	TAL CF
Total/NA	Analysis	365.1		1	278906	05/14/20 20:09	JMH	TAL CF

**Client Sample ID: GMW-21**

Date Collected: 05/11/20 11:45  
Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-7**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		10	279177	05/18/20 16:37	TRZ	TAL CF
Total/NA	Prep	351.2			279138	05/18/20 08:28	WJF	TAL CF
Total/NA	Analysis	351.2		1	279270	05/18/20 19:42	JMH	TAL CF
Total/NA	Analysis	353.2		1	279050	05/15/20 18:22	JMH	TAL CF
Total/NA	Prep	365.2/365.3/365			278824	05/14/20 09:39	JWG	TAL CF
Total/NA	Analysis	365.1		1	278906	05/14/20 19:40	JMH	TAL CF

**Client Sample ID: Duplicate**

Date Collected: 05/11/20 00:00  
Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-8**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		10	279177	05/18/20 17:03	TRZ	TAL CF

**Client Sample ID: Trip Blank**

Date Collected: 05/11/20 00:00  
Date Received: 05/12/20 09:35

**Lab Sample ID: 310-181529-9**

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	278849	05/14/20 13:50	TRZ	TAL CF

Eurofins TestAmerica, Cedar Falls

## Lab Chronicle

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

### Laboratory References:

TAL CF = Eurofins TestAmerica, Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15

# Accreditation/Certification Summary

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

## Laboratory: Eurofins TestAmerica, Cedar Falls

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-21

## Laboratory: Eurofins Calscience Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-20
Arizona	State	AZ0671	10-14-20
California	Los Angeles County Sanitation Districts	10256	06-30-20
California	State	2706	06-30-20
Guam	State	20-004R	01-23-21
Hawaii	State	CA01531	01-29-21
Kansas	NELAP	E-10420	07-31-20
Nevada	State	CA015312020-8	07-31-20
Nevada	State	CA015312020-8	07-31-20
Oregon	NELAP	4028 - 007	01-29-21
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-20

## Method Summary

Client: Ramboll US Corporation  
Project/Site: Vogel Project Iowa

Job ID: 310-181529-1  
SDG: Ramboll #44019383

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	TAL CF
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL CF
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL CF
365.1	Phosphorus, Total	EPA	TAL CF
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL CF
365.2/365.3/365	Phosphorus, Total	MCAWW	TAL CF
5030B	Purge and Trap	SW846	TAL CF

### Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

### Laboratory References:

TAL CF = Eurofins TestAmerica, Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Environment Testing  
TestAmerica

310-181529 Chain of Custody

## Cooler/Sample Receipt and Temperature Log Form

Client Information	
Client: Ramboll US Corp	
City/State:	CITY: Irvine STATE: CA
Project: Vogel Project Iowa	
Received Information	
Date/Time Received:	DATE: 8/12/20 TIME: 0935
Received By: JC	
Delivery Type: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____	
Condition of Cooler/Coolants	
Sample(s) received in Cooler? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler ID: _____	
Multiple Coolers? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Cooler # _____ of _____	
Cooler Custody Seals Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Which VOA samples are in cooler? _____  All vials accounted for	
Temperature Record	
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE	
Thermometer ID: M Correction Factor (°C): +0.1	
Temperature Criteria = (Unadjusted Temp - Temp blank temperature) above criteria proceed to Sample Container Temperature	
Uncorrected Temp (°C): 0.1 Corrected Temp (°C): 0.8	
Sample Container Temperature	
Container(s) used:	CONTAINER 1 CONTAINER 2
Uncorrected Temp (°C):	
Corrected Temp (°C):	
Exceptions Noted	
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No	
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No	
NOTE: If yes, contact PM before proceeding. If no, proceed with login	
Additional Comments	

# TestAmerica

Cedar Falls Division  
704 Enterprise Drive  
Cedar Falls, IA 50613

THE LEADER IN ENVIRONMENTAL TESTING

Client Name: Ramona L. S. Cope

Phone 319-277-2401 or 800-753-2401  
Fax 319-277-2425

Address: 5 Park Plaza Suite 500

Project Name: VOCs & Protect Iowa

City/State/Zip Code: Iowa City, IA 92614

Project #: Ramona # 44019383

Project Manager: Eric Smith

Site/Location ID: RM-0002

Client #:

Email Address: ESmith.Ramona@Ramboll.com

Report To: Eric Smith, Ramboll

Telephone Number: 949-798-3603

Invoice To: Ramboll US Corp

Sampler Name (Print Name): Brett Witzky, Geotek

Quote #:

Sampler Signature: 

Date: 10/10/20 Time: 10:30 AM

YAT	Standard	Rush (surcharge may apply)	Date Needed:	Fax Results: Y N	Email Results: Y N	SAMPLE ID	Date Sampled	Time Sampled	Field Filtered	G = Grab, C = Composite	H2O	H2SO4	HNO3	HCl	HBr	Hg	Mercury	Node	Notes	Other (Specify)	Analyze For:	QC Deliverables
Gmw-102			10/10/20			Gmw-102	10/10/20	10:30 AM	-	X	X	X	X	X	X	X	X	X	X			
Gmw-11			10/10/20			Gmw-11	10/10/20	10:30 AM	-	X	X	X	X	X	X	X	X	X	X			
Gmw-13			10/10/20			Gmw-13	10/10/20	10:30 AM	-	X	X	X	X	X	X	X	X	X	X			
Gmw-14			10/10/20			Gmw-14	10/10/20	10:30 AM	-	X	X	X	X	X	X	X	X	X	X			
Gmw-15			10/10/20			Gmw-15	10/10/20	10:30 AM	-	X	X	X	X	X	X	X	X	X	X			
Gmw-21			10/10/20			Gmw-21	10/10/20	10:30 AM	-	X	X	X	X	X	X	X	X	X	X			
Duplicate			10/10/20			Duplicate	10/10/20	10:30 AM	-	X	X	X	X	X	X	X	X	X	X			

Special Instructions:

LABORATORY COMMENTS:

Retainquished By: <u>Brett Witzky</u>	Date: <u>10/10/20</u>	Time: <u>10:30 AM</u>	Received By: <u>DN</u>	Date: <u>10/10/20</u>	Time: <u>10:25</u>
Retainquished By: _____	Date: _____	Time: _____	Received By: _____	Date: _____	Time: _____
Retainquished By: _____	Date: _____	Time: _____	Received By: _____	Date: _____	Time: _____

YAL-0000 (0708)

Page \_\_\_\_ of \_\_\_\_

## Login Sample Receipt Checklist

Client: Ramboll US Corporation

Job Number: 310-181529-1  
SDG Number: Ramboll #44019383

**Login Number:** 181529

**List Number:** 1

**Creator:** Homolar, Dana J

**List Source:** Eurofins TestAmerica, Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



10515 Research Drive  
Knoxville, TN 37932  
Phone: (865) 573-8188  
Fax: (865) 573-8133

---

**Client:** Eric Smith  
Ramboll  
5 Park Plaza  
Suite 500  
Irvine, CA 92614

**Phone:**

**Fax:**

**Identifier:** 030RE

**Date Rec:** 05/12/2020

**Report Date:** 05/18/2020

**Client Project #:** 1690001847-008      **Client Project Name:** Verdant: Vogel Iowa Remediation

**Purchase Order #:**

**Analysis Requested:** CENSUS

**Reviewed By:**

A handwritten signature in black ink, appearing to read "John H. Miller".

---

**NOTICE:** This report is intended only for the addressee shown above and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this in error, please notify Microbial Insights, Inc. immediately. The data and other information in this report represent only the sample(s) analyzed and are rendered upon condition that it is not to be reproduced without approval from Microbial Insights, Inc. Thank you for your cooperation.

**MICROBIAL INSIGHTS, INC.**10515 Research Dr., Knoxville, TN 37932  
Tel. (865) 573-8188 Fax. (865) 573-8133**CENSUS**Client: **Ramboll**  
Project: Verdant: Vogel Iowa RemediationMI Project Number: **030RE**  
Date Received: **05/12/2020****Sample Information**

Client Sample ID:	GMW7R	GMW21	GMW11	GMW15	GMW10R
Sample Date:	05/11/2020	05/12/2020	05/11/2020	05/11/2020	05/11/2020
Units:	cells/mL	cells/mL	cells/mL	cells/mL	cells/mL
Analyst/Reviewer:	HT	HT	HT	HT	HT

**Functional Genes**

Phenol Hydroxylase	PHE	<b>3.05E+04</b>	<b>2.91E+04</b>	<b>5.02E+01</b>	<b>4.97E+02</b>	<b>3.27E+03</b>
Ethylbenzene dioxygenase	EDO	<4.80E+00	<b>1.22E+03</b>	<4.70E+00	<b>3.42E+02</b>	<4.70E+00

**Phylogenetic Group**

Total Eubacteria	EBAC	<b>1.86E+06</b>	<b>6.73E+06</b>	<b>3.22E+04</b>	<b>1.81E+06</b>	<b>4.43E+05</b>
------------------	------	-----------------	-----------------	-----------------	-----------------	-----------------

**Legend:**NA = Not Analyzed    NS = Not Sampled    J = Estimated gene copies below PQL but above LQL    I = Inhibited  
< = Result not detected

**MICROBIAL INSIGHTS, INC.**

10515 Research Dr., Knoxville, TN 37932  
Tel. (865) 573-8188 Fax. (865) 573-8133

**CENSUS**

Client: **Ramboll**  
Project: Verdant: Vogel Iowa Remediation

MI Project Number: **030RE**  
Date Received: **05/12/2020**

**Sample Information**

Client Sample ID:	<b>GMW13</b>	<b>GMW14</b>
Sample Date:	05/11/2020	05/11/2020
Units:	cells/mL	cells/mL
Analyst/Reviewer:	HT	HT

**Functional Genes**

Phenol Hydroxylase	PHE	<b>1.50E+04</b>	<b>5.34E+03</b>
Ethylbenzene dioxygenase	EDO	<b>4.36E+03</b>	<b>5.33E+04</b>

**Phylogenetic Group**

Total Eubacteria	EBAC	<b>4.66E+06</b>	<b>1.05E+07</b>
------------------	------	-----------------	-----------------

**Legend:**

NA = Not Analyzed    NS = Not Sampled    J = Estimated gene copies below PQL but above LQL    I = Inhibited  
< = Result not detected

**Quality Assurance/Quality Control Data**

Samples Received	5/12/2020	Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
EBAC			05/12/2020	05/18/2020	0 °C	101%	non-detect	non-detect
PHE			05/12/2020	05/18/2020	0 °C	112%	non-detect	non-detect
EDO			05/12/2020	05/18/2020	0 °C	112%	non-detect	non-detect
Samples Received	5/13/2020	Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
EBAC			05/13/2020	05/18/2020	0 °C	100%	non-detect	non-detect
PHE			05/13/2020	05/18/2020	0 °C	112%	non-detect	non-detect
EDO			05/13/2020	05/18/2020	0 °C	112%	non-detect	non-detect